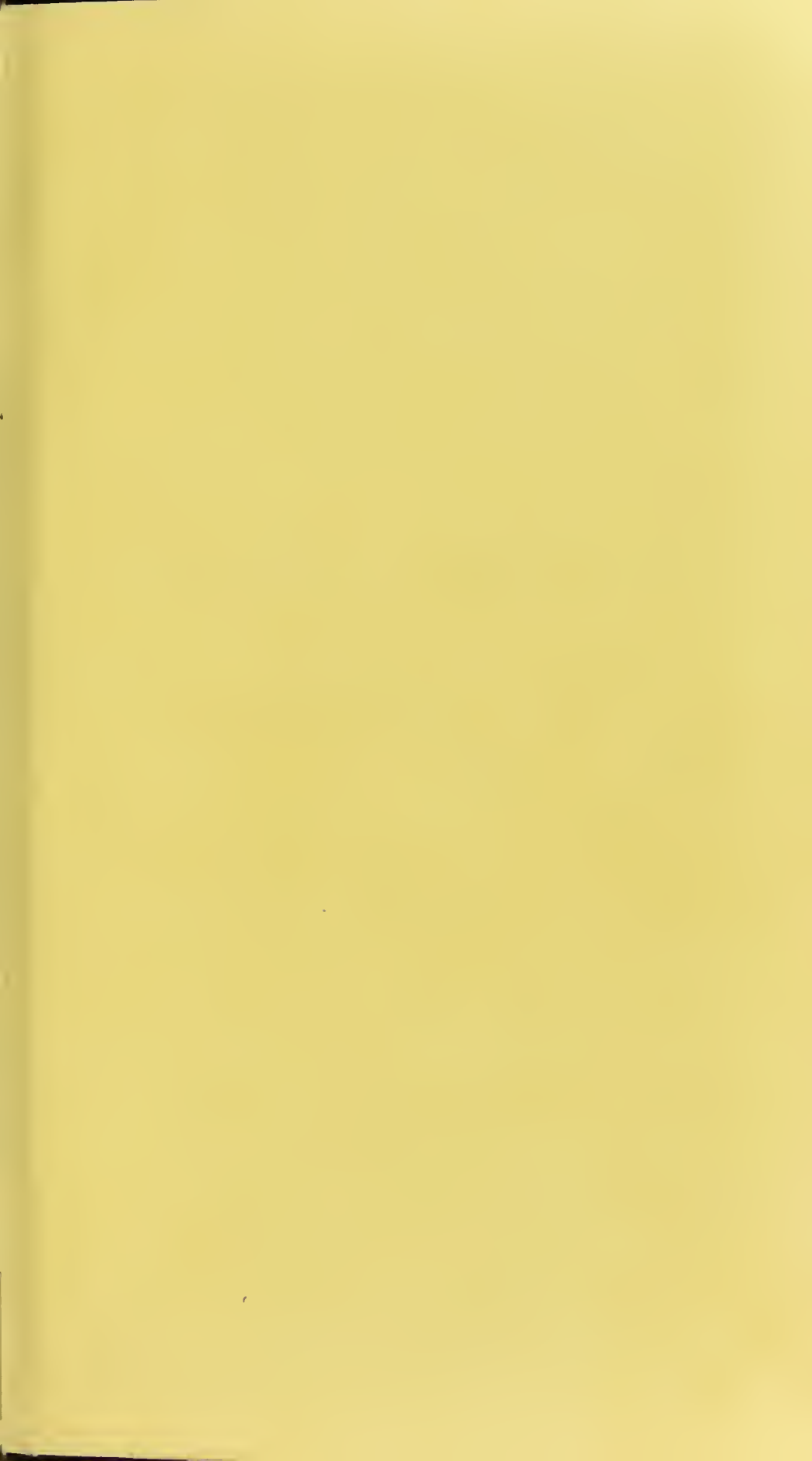




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FIRST LINES
OF
VETERINARY PHYSIOLOGY
AND
PATHOLOGY.



FIRST LINES
OF
VETERINARY PHYSIOLOGY
AND
PATHOLOGY.

BY
JAMES CLARK,
FARRIER TO HIS MAJESTY FOR SCOTLAND, AND VETERINARY
PROFESSOR EDINBURGH.

VOLUME FIRST.

Sicut animalia post hominem, ita ars
Veterinaria post medicinam secunda est.

Vegetius.

EDINBURGH:

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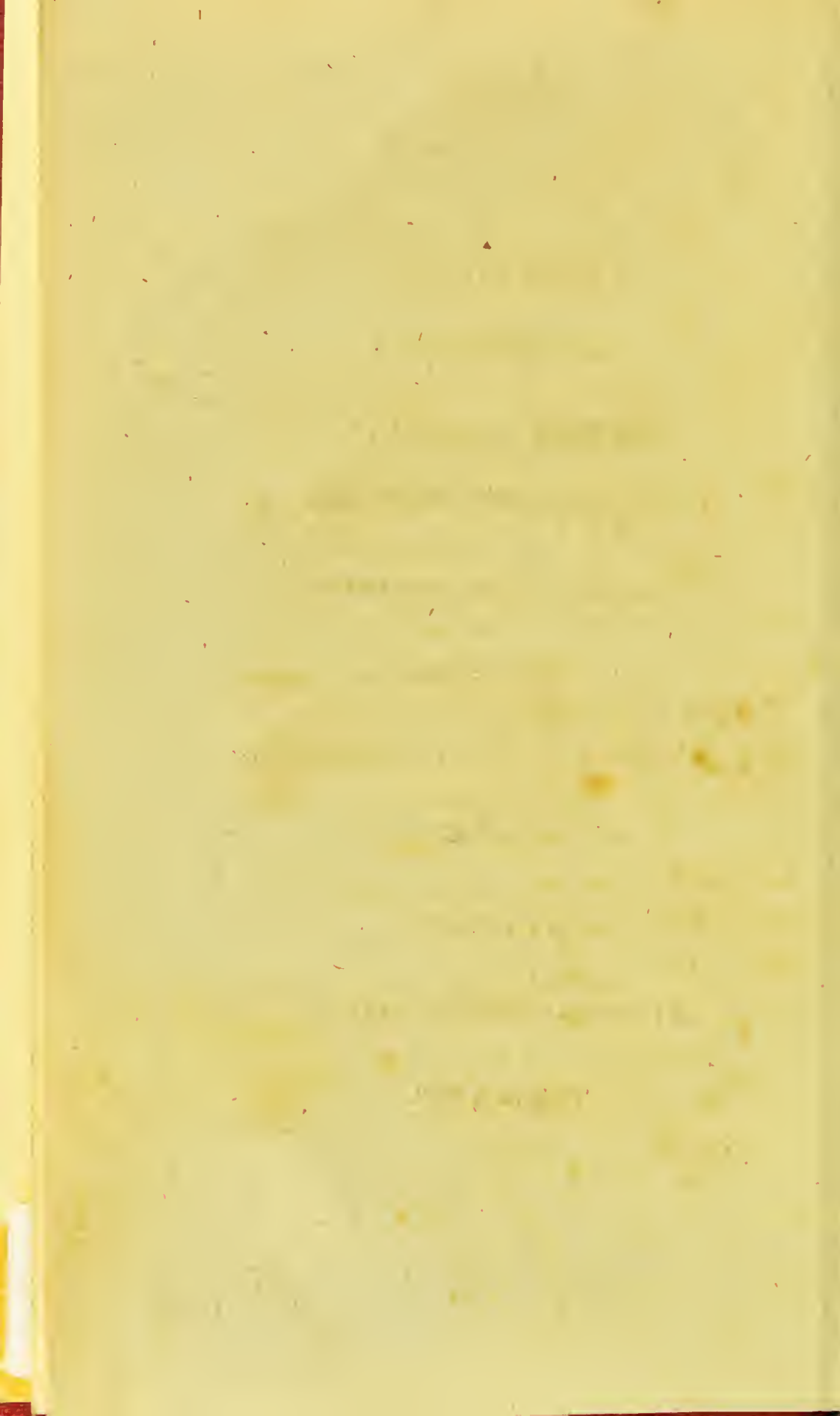
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MOST HUMBLE
AND MOST OBEDIENT SERVANT,
THE AUTHOR.



PREFACE.

THE following Essays, or First Lines of Veterinary Physiology and Pathology, are short Extracts from the Lectures which were composed in the years 1793 and 1794, on the prospect of a Veterinary School being established at Edinburgh, under the direction of the Author; but, from the political situation of the country at that time, did not take place. This school was to have been patronized by some of the first noblemen and gentlemen of the country; and, at the same time, the Author had the fullest assurance of the countenance of Government for its aid and support. For which reason, he declined the offer then made to him by the Directors of
the

the Veterinary College at London, of standing a candidate for the then vacant Professorship, by the death of M. St. Bell their first Professor.

THE Author anticipated the many advantages that would be derived from an institution of this kind in Edinburgh, from its vicinity to an University so justly famed for the celebrity of its medical and surgical Professors, and attended by a numerous concourse of Medical Students from all parts of Europe; that, whilst many of them were attending other branches of medical education, some might be induced to attend the Veterinary Class. The many advantages arising to the science from this circumstance alone, of being studied by men who had the advantage of a liberal education, would have been the surest means of improving the art, and of disseminating veterinary knowledge throughout the kingdom in a highly improved state.

ANOTHER

ANOTHER circumstance of equal importance attending a Veterinary School at Edinburgh, is, that young men who propose to follow the operative branch of shoeing horses, and indeed mechanics in general, get a better or more liberal education in this country, than their more southern brethren of the same professions in England.

TILL lately, no attempts have been made in Great Britain to improve the Veterinary art, by affording men of this profession proper opportunities of acquiring instruction, of course the art has been depreciated,—its Professors derided for their ignorance, and prevented from attaining that rank in science to which they are entitled. This neglect, and the consequent deficiency of sources of instruction, still compels them to continue in that old track handed down to them from father to son, now so generally and so justly condemned; and no set of men have hitherto valued less the theoretical part of the art they profess, or followed more implicitly the prac

tice of their predecessors, without inquiring why they did so, merely from the want of better information.

HOWEVER, from the Veterinary College established in London, much improvement is now looked for in this branch of neglected science, and which has undoubtedly proceeded from the more general cultivation of all the different sciences in the present age. We may, therefore, anticipate the happy effects of the continuance of that spirit of improvement; and, although its progress may be slow amongst the present practitioners of the old school, who have imbibed prejudices in favour of their old practices, yet they, by proper instruction, and warned of the danger arising to their patients from adhering to improper practices and improper prescriptions, might be induced to follow more rational methods of cure, when pointed out to them. The young pupils, free from those prejudices already mentioned, will naturally adopt such precepts as were recommended

recommended to them for regulating their conduct in their future practice.

BUT still there is a want of more seminaries for instructing pupils in the Veterinary Art ; schools for that purpose ought to be more generally dispersed over the kingdom. Few pupils are able to afford the expence of attending the Veterinary College at London, during the time that is necessary to complete their education,—means of instruction ought to be afforded them nearer their homes. For this purpose, Veterinary schools ought to be established in the principal cities and county towns over the kingdom ; it is a national concern, or at least ought to be. The advantage arising from it would soon repay the community. By this means, the young beginners would have the opportunity of being properly instructed, and at a very small expence, as it would not carry them far from home ; the means of instruction rather coming to them. In all these schools, the Veterinary Art should be extended to other domestic

domestic animals beside the horse. They ought to include the diseases of cows and sheep, as a very great number of these animals are lost annually merely from the gross ignorance of those who take upon them the cure of diseases to which they are liable. Unfortunately, many of the diseases of cows in particular, are, by the weak and credulous, still imagined to be the effects of witchcraft, &c. To root out the above prejudices, and endeavour to establish a more rational practice in the country, is certainly an object worthy of attention, and ought to be supported with all the influence of the Board of Agriculture, as the means of preserving the farmer's stock is of equal importance with improving his breed of cattle. A diversity of schools throughout the kingdom would create an emulation amongst the masters to excel or rival one another, by stirring up a spirit for improving the art they profess.

One great bar to the farther improvement of the Veterinary Art, is the want of books of instruction on the rudiments or first principles

ciples of the profession ; as all the authors who have wrote on the Veterinary Art previous to the institution at London, (Snape and Gibson's Anatomy of the Horse excepted) may be considered rather as compendiums of the formulæ of medical prescriptions that are recommended by the Authors, when such diseases as they describe are actually known and ascertained to exist in the patient at the time ; of course, such writings are only of use to the already learned, and can convey no information to the young beginner. To ascertain the real seat of a disease in a mute patient with precision, is the great difficulty in the Veterinary Art ; it requires not only experience but great abilities, judgment, and penetration, as no information can be got from the patient where his ailment lies. Here a knowledge of the structure of the body, and of the uses and connection of the different organs, assisted by a well grounded medical theory, will lead the practitioner to the deduction of general principles, from particular symptoms before him, and apply them to the case of his patient. This will lead to a
knowledge

knowledge of the true seat and nature of the disease, and point out the proper remedies.

BUT, farther, those authors, who have hitherto treated on Veterinary subjects, have wrote, as has been observed, for the learned only, and to understand them requires more medical knowledge than the reader may possess. They likewise introduce the reader very abruptly to the practice of physic at once, without that previous knowledge so essentially requisite in the different branches of medical science in order to enable him to comprehend the subject treated upon. They therefore tend to perplex and embarrass the reader, and to promote that spirit of quackery, already too prevalent in Veterinary practice, whilst at the same time it puts a stop to all investigation from individual practitioners, in searching into the nature and causes of diseases, or the proper means of cure; and, as the remedies prescribed in these books are too frequently held out as specifics for every disease on which they treat. For the same reasons, it
will

will be obvious that the Veterinary pupil can reap no advantage from the perusal of these books, unless he is previously made acquainted with the first principles of his profession by a master.

WITH respect to the virtues of medicines, or the effect they may, or ought to produce in the different cases of his patients, the young beginner ought to study the *Materia Medica*, where he will find the virtues of each described.

THE Author has, therefore, departed from the usual method observed in Treatises upon the Veterinary Art, which always assume, or take for granted, that the first principles of the science are known to the reader, when, in fact, the pupil or the reader should never be so much as supposed to know them, till they have been sufficiently explained by the master. The same Authors likewise make use of a variety of scientific terms, which they have neither explained nor defined, and suppose, or take it for granted, that they are already

already known by the pupils they are only beginning to instruct.

MANY obstacles present themselves to the majority of veterinary practitioners at present, who ardently wish to improve themselves in their profession, if the means were within their reach. Besides, to become acquainted with that branch of science only which relates to their own profession, or which may be intimately connected with it, requires, at the same time, a knowledge or acquaintance with the general principles of other sciences, of which they can acquire no information, unless they are pointed out to them by masters. Hence the utility of public lectures, as that is the easiest and only method by which a general knowledge of any science can be obtained, where a number may be instructed at one time as easy as a few.

THE familiar style in which public lectures ought to be delivered, recommend that method in particular as the only or most convenient

convenient mode of teaching the elements of every branch of learning, and conveying instruction to the young and unexperienced in science : When this is done properly, it awakens the attention of the student ; it abridges his labour ; guides his inquiries ; it relieves the tediousness of private study ; and impresses on his mind the principles of science. For the trouble of listening only, he acquires that information that has been drawn from numerous sources, and he becomes possessor of the result of long continued and severe study of the master.

PUBLIC Lectures on the Veterinary Art would soon banish those absurd practices that at present prevail, and remove those prejudices to what the illiterate ironically call Book Learning, and awaken in them a desire to search farther into the subject. As they advance in knowledge, new objects would present themselves, and augment their ardour for farther research and improvement. By this means, many of those practitioners, who may

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be said to be of the old school, and averse to study, and who by no other means could have been induced to follow out a long chain of reasoning from books they do not understand, would be led step by step to the knowledge of general principles, and obtain a rational knowledge in the art they profess.

THE Author, from his own experience, aware of the many difficulties the Veterinary pupil labours under on his first outset and beginning to study, from the want of a proper guide or help to make him acquainted with many of the terms that are used by medical writers ; he, therefore, proposes, by way of introduction to his First Lines of Veterinary Physiology and Pathology, to give a short definition*, or rather a short description

* These definitions were intended to have been printed separately, and given to those pupils who attended the Veterinary Class at Edinburgh, as a pocket manual, to have recourse to occasionally.

tion of some of those terms that are used in the different branches of Medical Science ; that when such terms occur either in lectures or in reading, the young pupil may have some idea not only of the meaning of these terms, but likewise the general use to which they are applied ; so that, by these helps, he may acquire a facility in reading medical books, and have a ready comprehension of the meaning of the Author he consults. This will smooth the road to farther instruction, till, in the course of his studies, he is more fully and more particularly informed.

THESE definitions, to the already learned, may be considered as superfluous and unnecessary ; but to the unlearned beginner, just entering on his studies, and for whose use they are chiefly intended, they will prove of singular service, and remove in them one great obstacle to the study of a subject which they could not otherwise understand or comprehend. It will afford them, as it were, a
key

key to open their minds for instruction ; and from attention and perseverance, the definitions will become familiar to them.

THE only apology that can be made for entering so minutely into the rudiments of the Veterinary Science, is from an ardent desire to render the study of it easy and accessible to that class of men who make choice of this profession, and who, in general, from their station and situation in life, cannot be expected to have got what may be called a very liberal education.

THE very nature of this profession, as operative Farriers, who must work at the forge, and who must undergo great bodily fatigue, and even hazard to their persons, in the execution of the duties of their office, has consigned this employment, from the most remote times, into the hands of men of athletic habits, capable of such exertions, and, for that reason, must be continued in the same channel. It is this useful class of men, wherever

wherever they are, whither in cities, towns, or villages, that must be taught and instructed in their profession in a regular and scientific manner. For, as I have just observed, in their hands this branch of the healing art will continue in spite of every endeavour to the contrary. No doubt, in great cities, in great towns, and in the army, men eminent in the Veterinary Science, and who have been taught it in a regular manner, will find employment, without attending to the more laborious branch of the profession, yet still the unavoidable connection between the operative branch of shoeing horses, and the scientific branch of curing their diseases and lamenesses, must, and will continue to give the operative farrier and country practitioner, a preference in the more distant parts, especially where these animals are bred and reared, and whose lives, in cases of disease, &c. must be intrusted to their care.

WHAT

WHAT was Surgery about a century ago? It was then consigned into the hands of men much more illiterate than Farriers are in this enlightened age. To the hands of ignorant Barbers, and which is the case still in many parts of Europe; the great perfection to which that art is now arrived, is entirely owing to its being properly cultivated as a science.

LET the young Veterinarian have the same opportunities of instruction as the Physician and Surgeon,—his profession requires it. For, the only difference between these occupations, is the subject each of them have to act upon, as the diseases of animals must ultimately be cured on the same principles as those of the human body.

UPON the whole, to the intelligent and observing, there cannot remain the least doubt of the practicability of what has been suggested. The means of putting it into execution must be left to those who have it in their power to promote whatever relates to
the

the interests of society ; humanity requires that we should pay every attention in our power to relieve or to mitigate the distresses of those domestic animals who too frequently undergo a deal of unnecessary misery from their services to man, and to which they would not be subjected in that state in which Nature has placed them.

THE plan adopted in the following Treatise on Veterinary Physiology and Pathology, is taken from the most modern writers on that subject on the human body, adapting its precepts and principles, where necessary, to the structure and economy of domestic animals ; and the Author flatters himself, that it may serve for a foundation in its kind, of a rational and regular practice, not only to those who have been previously instructed in anatomy, but to those who have not had these advantages, or a less liberal education ; and to those who have had all the advantages of a liberal education and instruction in the Veterinary Art, it may supply

ply the place of a remembrancer, or a recapitulation of what they have been taught in a better and more difused manner.

It is hoped that those readers, for whose benefit the following Treatise is principally intended, that is, beginners and the unlearned, will find their account in having the use and connexion of the different organs in the body explained, together with the diseases such organs are most liable to, as this will have a tendency to render their ideas of the nature and seat of diseases more clear and comprehensive, and to imprint the rational indications of cure more deeply in their minds, and likewise to evince the close connexion between the theoretic and practical parts of medicine.

THE Author has endeavoured to be more particularly full on those heads which are most important, and in those cases which occur most frequent in practice, attended with the greatest danger to life, and soundness of the extremities,

tremities, and which have the nearest reference to rational practice.

AVERSE to ostentation or parade, the Author will avoid all pomposity of language, and endeavour to express himself with as much clearness and perspicuity as possible; nor will he attempt to swell his pages by illiberal criticisms on dead or living Authors, who have wrote on the Veterinary Art; nor will he suffer himself to be led away from his subject, by making unnecessary digressions not connected with the subject, but always having in view the instruction of the young beginner, and the improvement of the Veterinary Art.

THOSE who are versant with works of this kind, will readily admit of the difficulties attending its composition; and although this cannot be urged as an excuse for its errors, yet the Author hopes it will operate in obtaining a candid and indulgent criticism, as his endeavours, however weak, proceeds

D

from

from an ardent desire to improve Veterinary Science.

THE greater part of the following sheets were printed three years ago, when unfortunately the publishing of them was interrupted by a violent disorder in the Author's eyes, which terminated in a cataract in one of them, and which has happily been extracted with the greatest success, by that eminent surgeon and oculist, James Ware, Esq; of London.

N. B.—The second volume is in great forwardness; and will be published with the utmost speed.

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A
TREATISE
ON
VETERINARY PHYSIOLOGY
AND
PATHOLOGY.

TO WHICH IS PREFIXED, ARRANGED ALPHABETICALLY,

*A Short Definition of some of the TECHNICAL
TERMS used in the different branches of
Medical Science ;—being a necessary Pre-
liminary to the Study of VETERINARY
MEDICINE.*

ABDOMEN—The belly, which is divided
by anatomists on its outer surface into four
divisions, called regions, viz. the epigastric,
the umbilical, the hypogastric, and the lum-
bar. The cavity of the belly, which is
lined on the inside by a membrane called

the peritoneum, contains the stomach, intestines, mesentery, mesocolon, liver, spleen, pancreas, mesenteric glands, lacteal vessels, kidneys, renal glands, ureters; the bladder, rectum, and the internal parts of generation, are contained in that division of the trunk of the body which is called the pelvis. The abdomen or belly is divided from the thorax or chest by the diaphragm, and extends backwards to the beginning of the pelvis.

Abductor—The name of several muscles whose office is to draw back the parts into which they are inserted.

Aberration—In medical writings, means Nature's deviating from her usual course.

Ablution—Washing away, as washing off or rinsing.

Abomasum—The name of the fourth stomach of any animal that chews the cud.

Abortion—The birth of any animal before its due time.

Ab-

Abstergents—A name given to certain medicines called cleansing medicines. They are of a saponaceous nature, capable of dissolving concretions formed of earth and oil, &c. which water, simply as an abluent, cannot effect.

Abrasion—Implies a loss of substance by constant friction or rubbing. It is likewise applied to ulcers attended with a loss of part of the substance.

Absorb, absorption, absorbents—Is the sucking up or drawing into the pores of the skin and lungs, &c. such particles as they will admit of, as water or vapour from the atmosphere. The term absorbent is applied to several vessels in the animal body, as the lacteals, which absorb the chyle from the intestines; likewise to those vessels which are called lymphatics, which opening into the different cavities of the body, either naturally

turally or accidentally, take up any fluids that are secreted, and convey them into the blood. The term absorbent is likewise applied to those medicines which have the power of drying up redundant humours, either internally or externally.

Abscess—Means a cavity containing pus or matter in any part of the body. It means likewise a corruption of the fleshy parts in those tumors which follow from inflammation seated in the cellular membrane.

Acceleratores Urinæ—Muscles which forward the ejection of the urine.

Acerb—Whatever is sour, harsh to the taste, or a sourness with astringency.

Acetabulum—Is a large cavity in a bone to receive the convex head of another to give it the advantage of a circular motion.

Acids—A generic term; sharp or sour.
These

These substances are too well known to require any definition. They are either mineral, animal, or vegetable. The mineral are those of vitriol, nitre, or common salt. The animal is obtained from ants, and other insects. The vegetable are the juice of fruits, as lemons, &c. or the product of fermentation, as vinegar, tartar, &c.

Acetum—Vinegar.

Acidity—A term frequently applied to the juices of the stomach and intestines, when an excess of acid prevails there.

Acini—The name of certain glands which grow together in clusters like berries.

Acescent—A quality ascribed to vegetable food, in order to distinguish it from animal diet, which is called alkalescent.

Acriid—A term applied to those substances of a penetrating pungency. Applied to
the

TERMS DEFINED.

the skin, they inflame it. Chewed, they promote a discharge of saliva. Snuffed up the nose, they promote sneezing.

Accretion—Growth of the body.

Acrimony—Sharpness, tartness, or sour to the taste.

Acute Diseases—Are those diseases which come on suddenly. Are rapid in their progress, attended with great danger, and soon terminate either in a speedy recovery, or death ; or they may change into, or form the basis of, chronic diseases. The term acute is likewise applied to any thing that is sharp pointed, or has a sharp turn.

Adeps—Fat. An animal oil contained in that part of the cellular membrane called *membrana adiposa*.

Adhesion—Means the growing together of any parts of the body that are separated
in

in a healthy state, as the lungs adhering to the pleura.

Adiposa—The cellular membrane, or *membrana adiposa*.

Adnata—The outer coat of the eye which forms the white part. It is likewise called albuginea.

Aglutinants—A name given to certain medicines, which are said to thicken the fluids, when grown too thin, sharp, or corrosive.

Ægyptiacum—The name of an ointment, whose chief ingredient is verdigrise, much used in deterging and cleansing of foul ulcers, and keeping down proud flesh.

Æthiops Mineral—A preparation from mercury and sulphur.

Ætiology—A discourse or a treatise on the causes of diseases, and their symptoms.

Air—

Air—Air is that transparent, elastic, ponderous, compressible fluid which surrounds the terraqueous globe, and which, when greatly agitated, or driven in currents, is called wind. It possesses very many curious and interesting properties of the greatest importance. It was formerly considered as a pure element, but latter experiments have discovered that it is composed of three different constituent parts, separable from each other, and of very different properties, and to which the new chemical nomenclature has given names expressive of their qualities, as oxygen, azot, and carbonic acid gas; which see under their proper heads.

Aëriform Fluids—Those elastic fluids which escape from the mixture of certain chemical substances, or from substances exposed to a high temperature, and are called gases. Water, heated to a certain degree, evaporates by steam or vapour, into an elastic aëriform fluid.

Aërology—

Aërology—Is that branch of medicine which treats of air; explains its properties and use in the animal œconomy, and its efficacy in preserving and restoring health.

Albuginea—The inner coat of the testicles is so called on account of its white transparent colour. The *tunica adnata* of the eye is likewise called albuginea.

Albumen or *Albuminous*—Any liquor resembling the white of an egg, or any viscous pellucid liquor.

Alcali or *Alkali*—The name of a plant called kali; and because a great quantity of salt is obtained from this plant, the name of alkali has been given to the fixed salt of all plants; and, on account of effervescence arising upon mixing an acid liquor with this salt, all volatile or fixed salts, and all

earthy substances which ferment with acids have been denominated alkalis. The herb kali, which grows on the sea-coasts, when dried and burnt, affords a lixivium, which, when evaporated, is the fixed alkaline salt. Alkalis are distinguished into three classes; the mineral, vegetable, and the animal, according to the different substances from which they are extracted. The blood and humours, in certain diseases, are said to acquire an alkaline acrimony tending to putrescency.

Alcalescent—A quality belonging to animal diet.

Alcohol—The name given to spirit of wine, exalted to its highest purity and perfection.

Alteratives—Are those medicines which are supposed to make a change in the blood
and

and humours to the better, without any manifest operation or evacuation.

Alembic—A machine for distilling liquors.

Alexipharmics—Medicines used in the curing of malignant fevers.

Alexiterials—A name given to medicines which are recommended as preservatives from contagion.

Aliment—The food that is taken into the stomach to nourish the body.

Allantois or *allantoides*—The membrane so called which forms part of the secundines after birth. Its office is to contain the urine discharged by the foetus before birth, and peculiar to the brute species only, although some anatomists have asserted the existence of the allantois in the human species.

Allium—Common garlic, much used as a medicine for horses and other cattle.

Aloe

Aloe—A plant which affords the purging gum of the same name, of which there are three kinds, viz. the succotrine or zocotrine, the hepatic or Barbadoes, and the cabaline or horse aloes.

Althæa—Marshmallow, an herb.

Allumen—Alum, a salt, used as a powerful astringent.

Alveoli—The sockets in the jaws in which the teeth are set.

Amaurosis—Is a decay or loss of sight when no fault is observed in the eye, except that the pupil is something enlarged and motionless.

Amara—Bitters. The term amara is used in medical prescriptions to signify bitters.

Amnion or *amnios*—The internal membrane which furrounds the fœtus. It is a fine transparent membrane, soft but tough, smooth on its inside but rough on the outer.

The

The amnion is found in all animals, both viviparous and oviparous.

Analeptics—Are such medicines as exhilarate the spirits; they are likewise called cordials.

Analogy—Is the mode of reasoning of things not perfectly known, by comparison with others which are better understood, and drawing conclusions from their similitude.

Analysis, or *analyse*—Is the reducing by chemistry any matter or substance into its primary constituent parts, with a view of discovering its compound parts.

Anasarca—A species of dropsy, from a ferous humour spreading between the skin and the flesh, or a general accumulation of lymph in the cellular substances. This occurs frequently on the breast and belly of horses.

Anastomose

Anastomose—A term in anatomy to express the inosculation or joining of the arteries with the veins.

Anuerism—Is a tumor arising from the dilatation of the coats of an artery.

Anatomy—Is that branch of science which teaches us the knowledge of the structure of an animal body by dissection.

Anchylosis—Is a growing together of the ends of two bones that have been separated by cartilages in a natural healthy state. But when these cartilages are eroded or destroyed by any cause whatever, the ends of the bones unite and form one bone, hence a stiff joint and lameness.

Angina—A quinsy or sore throat, which is an inflammation in those parts that are subservient to deglutition or swallowing.

Animal—All bodies indowed with life
and

and with spontaneous motion are called animals, of course all substances belonging to or proceeding from animals are said to be belong to the animal kingdom, in order to distinguish them from the vegetable and mineral classes.

Animalculae—A diminutive of the word animal, that is they are so little animals as require to be viewed through glasses in order to distinguish or discern them distinctly.

Animal Economy—Is the conduct of nature in the formation and preservation of animal bodies.

Animal Heat—Proceeds from that portion of fire which is contained in the blood of all perfect animals.

Animal Motion—May be either voluntary or involuntary. The involuntary are those of the heart and arteries. The lungs and muscles

muscles of the thorax. The voluntary are under the direction of the will.

Animal Faculty—The power of performing any action of the body. The term faculty is likewise applied to that of the senses, as the faculty of seeing, hearing, &c. In the human body, it extends to that of memory, imagination, and reasoning.

Anise—An herb. The seeds of which are only used in medicine, and are of great use in flatulent complaints, as griping of the bowels.

Anodyne—Such medicines as are given with a view to ease pain and procure rest or sleep. They are likewise called *opiates* and *narcotics*.

Anorexy—A want of appetite, without altogether a loathing of food.

Antacids—Such remedies as resist or destroy acids in the stomach and *primæ viæ*, or first passages.

Anthelmintic—Those medicines which are given as remedies against worms.

Antidote—Those medicines that are given to prevent the bad effects of any poisonous substance taken into the stomach, or apprehended contagion.

Antimony—Is a ponderous brittle mineral, composed of long shining streaks like needles, intermingled with a dark lead coloured substance, of no manifest taste or smell; much used as an alterative to horses.

Antiphlogistic—A term given to certain remedies which tend to lower the system, by exhausting the living powers; and this is done most readily by evacuations, particularly by bleeding and purging.

Antiseptics—Such remedies as resist putrefaction.

Antispasmodics—Remedies against convulsions.

Anus—The extremity of the intestinum rectum, called the fundament.

Antrum—Implies a cavity or labyrinth. Hence it is applied to the labyrinths of the ears; to the antrum maxillare, or maxillary sinuses, which are situated in each cheek in the upper jaw, and opens on their upper part into the nostrils. This sinus is always more or less filled with a mucous matter in that disease so fatal to horses called the glanders.

Aorta—The name of the great artery proceeding from the left ventricle of the heart.

Aphorism—A short sentence expressing the properties of a thing; a maxim or principle to direct to any knowledge in the different sciences.

Aptbae—

Apthae—Small spreading ulcers in the mouth, by some called the thrush.

Apex—A term used in describing any thing that has a point, as the apex or point of the heart.

Aponeurosis—A term in anatomy which signifies any tendinous expansion of a muscle, which grow gradually thinner till they are lost in the cellular membrane. They likewise bind down certain muscles while in action, and increase their strength by compressing them.

Apophysis or *Epiphysis*—An appendix or a bone annexed to another by means of a cartilage. This cartilage is only observable in young subjects, for in adults it cannot be distinguished from the bone.

Apoplexy—Is a sudden privation of all sense and voluntary motion; the pulse, at the same time, being kept up; but respiration
tion

tion is oppressed. A deep sleep, with insensibility and snorting, seems to be constant attendants of this disorder both in man and in other animals.

Aqua—The Latin name of water; and which is always continued in medical prescriptions under that term, whether simple water, or officinal by distillation with herbs, or with spirits, &c. Water has always been considered as a pure and simple element, till of late years it has been discovered, by experiments, that it consists of two distinct parts, separable from one another, and to which the new chemical nomenclature has given names expressive of their qualities, as oxygen and hydrogen; which see under their proper heads.

Arachnoid—One of the coats of the eye which resembles a spider's web. It is also called *aranea*. Likewise that fine transparent membrane lying between the dura and pia mater of the brain.

Arcanum

Arcanum—A secret; or a medicine whose preparation or efficacy is kept secret, in order to enhance its value.

Ardent—A term given to those fevers which are attended with great heat. It is likewise applied to strong spirits.

Argilla—Clay or argillaceous earth, of a soft substance; very ductile and tenacious when moist, but rendered hard by fire.

Aromatic—Aromatics, or spicy drugs, which are of a warm pungent taste, with more or less of a fragrant smell.

Arsenic—or Ratbane. A mineral, found more or less in ores of metal. A violent poison.

Artery—The name of those round vessels which take their rise from the heart, and contain that fluid which is called blood. Their office is to convey the red blood from the heart through all parts of the body.

Articulation

Articulation—The joints, or the joining of bones together by ligaments.

Ascarides—A species of worms, so called from their continual troublesome motion, which causes an itching at the anus. They are very small, like long needles, white, and have sharp pointed heads. They are generally lodged in the rectum both of man and animals, but sometimes they are found higher up in the intestines.

Ascites—Dropsey, or collection of water in the belly.

Assimilate—To make like to. To assume a quality, as when the aliment that is taken into the stomach is converted or assimilated into blood.

Asthma—Is a disease of the chronic kind, attended with a laborious respiration or breathing. In our patients it is called broken wind.

Astringents

Astringents—Are those substances which contract and strengthen the fibres, after being relaxed, as in bruises and strains externally. Internally, astringent medicines are given with the view of checking too great secretions.

Atmosphere—Is the whole body of air and vapour which surround the earth.

Atony—A defect of muscular power; such as relaxation, laxity, or debility.

Atrophy—Is a wasting or decay of any member or part of the body, or of the whole body.

Attenuants—Such medicines as are supposed to attenuate or make thin the too thick fluids in the body.

Attrition—Implies to rub or wear away, by constant action on the parts. Thus the circulating fluids are said to wear away the
fides

sides of the vessels in which they circulate. Attrition is likewise applied to the action of the stomach in digesting the food.

Auricle—The external part of the ear. It is likewise applied to the two muscular bags at the basis of the heart, which are called its auricles or ears, and are joined to the ventricles.

Axis—A point on which any thing revolves, or is supposed to revolve.

Azigos—Signifies without a fellow ; as some particular muscles and veins have no fellow, they are termed azigos.

Azot—One of the constituent parts of atmospheric air ; when collected by itself it is called azotic gas ; a name in the new chemical nomenclature expressive of its noxious qualities, as it kills animals the instant they draw it into the lungs. It extinguishes

tinguishes flame, and will not admit of the combustion of inflammable bodies, nor of the calcination of metals.

B.

Back-racking—A term for an operation in farriery, which is, after anointing the hand and arm with fresh butter, hoglard, or oil, to introduce it into the anus, and, by degrees, draw out the hardened excrements out of the rectum. In the human body, in like cases, a marrow spoon is made use of.

Balsamics—A name given to a certain class of medicines, meant to express their healing qualities.

Barbs—A term in farriery. The name of a disease said to be in the mouths of horses, but which is only founded on ignorance of the structure of the parts.

Barometer—An instrument to determine the weight of the air, or to observe its changes, commonly called a weather-glass.

Basis—The foundation, bottom, base, or pedestal; the support of any thing. Thus, the broad part of the heart is called its basis, to distinguish it from its apex or point.

Biceps—A double headed muscle.

Bile—Is a bitter viscid juice, secreted from the blood in the liver. In the human body, it is collected into a receptacle called the gall bladder or cyst. Hence, in man, there may be said to be two kinds of bile, the cystic and the hepatic. But in our subject, who has no gall bladder, the latter only is secreted, and passes continually into the duodenum, where it mixes with the chyle. If, from any cause, the bile is carried into the blood, it produces the jaundice; and, if long continued, by dissolving the blood, a dropsy follows.

Bladder

Bladder—That vessel which is situated in the pelvis and where the urine is collected, and afterwards discharged from the body. It is commonly called in medical writings *vesica urinaria*.

Blood—Is that red fluid which is contained in the arteries and veins. On a superficial view, it appears of an uniform quality; yet, at the same time, it consists of very dissimilar parts, viz. the red globules or crassamentum, serum, salt, earth, fixed air, and iron. To these may be added elementary fire.

Blood spavin—A term in farriery, and which is a dilatation or enlargement of the vein on the inside of the hough, extending below and above the joint, but more enlarged towards the middle. In the human body, such enlargement of the veins are called varix, or varicose swellings.

Bones

Bones--Are the hardest and most solid parts of an animal body. They serve as the basis to support the whole frame, and to preserve the softer and less firm parts in all their motions and pressures. The bones are covered with a membrane called the *periosteum*, which is exquisitely sensible when inflamed, being plentifully supplied with nerves and blood vessels.

Bone spavin--In farriery, an excrescence growing on the bone, on the hough joint, or near it.

Borborygmus--A rumbling noise in the bowels; excited by wind mixed with some degree of humidity.

Botany--Is the science of plants, or that part of natural history which belongs to the vegetable kingdom.

Boulimus, boulimia, bulimy--A voracious appetite, called the hungry evil. *Bulim̃* signifies an ox's appetite.

Bovina

Bovina affectio—A disease among black cattle, caused by a worm lodged between the skin and the flesh.

Botts—A thick short round worm, about the size of a large bee, which infests the stomach of horses.

Brain—See cerebrum and cerebellum.

Broken wind—See asthma.

Bronchia—The aspera arteria, or windpipe, which descends from the fauces or throat, growing narrower as it approaches the lungs, where it divides into two branches, one to each lobe of the lungs. The term bronchial is likewise applied to certain arteries, &c.

Bronchotomy—The operation of cutting, or making an opening between the rings of the windpipe.

Bursae—

Bursae mucosae—Certain bags about the joints and tendons, whose office it is to emit a lubricating mucus to facilitate motion.

Bezoar—Are preternatural or morbid concretions, like stones, formed in the stomachs of several animals. In horses, they are mixed with the hair and dust they lick off their bodies.

C.

Cachexy—An universal bad habit of body, in which there is a defect of vital heat.

Caecum—The name of one of the intestines, called the blind-gut, from its being perforated at one end only.

Calcination—The reduction of solid bodies by the means of fire, from a solid to a powdery state, accompanied with a change of their qualities.

Cal-

Calculus, calculi—Stone, sand, or gravel. By the former is generally meant stone in the bladder or kidneys; by the latter, sand or gravel affecting these parts. The concretions observed in the passage of the bile, are called calculi or gall stones, although they are only concremented bile in hard lumps.

Callus—Hardened substances of the skin, &c. They are either cutaneous or osseous, natural or preternatural. But generally this term is applied to mean those callous substances generated about the edges of a fractured bone or wound.

Callosity—A kind of hard swelling without much pain.

Calomel—A preparation of mercury; called *mercurius dulcis*, or sweet mercury.

Caloric—A term in the new chemical nomenclature, which means sensible heat in all bodies, whether solid or fluid. Caloric

or heat is of such a penetrating nature, that no vessel can contain it ; it penetrates all bodies. It liquifies solid substances, and rarifies liquids, so as to render them invisible and give them the form of air, or what is called aeriform fluids.

Calx—The residue or remaining parts of minerals, metals, or stones, after undergoing the action of the fire.

Camphor—A vegetable concrete gum, unctuous to the touch, with a fragrant smell and a bitter aromatic taste, accompanied with a sense of coolness on the tongue.

Canal—Any duct or hollow pipe which conveys fluids, &c. through any part of the body. Thus the intestines are called the alimentary canal.

Cancer—A scirrhus tumour. Terminating in an ulcer of the worst kind.

Can-

Cancerous—A disposition or tendency towards cancer.

Cantharides—Spanish flies ; an insect of a golden green colour used in blisters.

Canthus—The angle of the eye, or the cavities at the extremities of the eyelids, called the corners of the eye. The greater canthus is next to the nose ; the lesser canthus lies towards the temples.

Capillary tubes—Are small vessels, or small fibres, in an animal body ; so called, because they resemble small hairs.

Capsula or *capsular*—The name of those ligaments which surround the joints. The name capsular is likewise applied to any thing that resembles a bag.

Carbon—The base of charcoal.

Carbonic acid gas—One of the constituent parts of atmospheric air ; so named in

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the

the new chemical nomenclature, expressive of its qualities ; amongst which are its absorbing from the lungs in respiration, a principle which exhales from the blood, and which appears to be of the same nature with carbon or charcoal.

Caries—Is a partial mortification of the bone, which separates from the sound part sooner or later. It is likewise applied to some species of ulcers where the bone is supposed to be affected.

Carus, caros—A name given to those diseases in which there is great insensibility, heaviness, and sleepiness, with quiet respiration.

Cartilages or *gristles*—Are solid, smooth, white elastic substances, between the hardness of a bone and that of a ligament. They cover the extremities of the bones in the articulations of the joints.

Ca-

Carotid—The name of the arteries of the neck, external and internal.

Caruncle—A small piece of flesh, or an excrescence that has the appearance of flesh. Thus, there are the *caruncula lachrymalis* in the corners of the eyes, and *carunculae myrtiformes* at the entrance of the vagina, &c.

Carminatives—The name given to those medicines which are supposed to dispel wind from the stomach and bowels.

Carnivorous—Devourers of flesh. Animals whose food is flesh are thus called.

Castration—The operation of gelding, cutting away the testicles.

Catalepsy—A name given to a certain species of apoplexy.

Cataract—Is an opacity or whiteness of
the

the cryſtalline humour or lens of the eye, which prevents the rays of light paſſing through it to the retina, and preventing viſion.

Catarrh—Is an inflammation of the mucous membrane which lines the noſe and parts adjacent, followed with an increaſed morbid diſcharge of the natural ſecretions from the noſe, eyes, mouth, throat, and lungs. In the leſſer degrees of this complaint it is called a cold.

Cathartic—The name given to purging medicines.

Catholicon—A general or univerſal medicine, which was formerly ſuppoſed to purge off all kinds of bad humours.

Cauſe—A cauſe of a diſeaſe is whatever impairs the animal functions, by producing

ducing disorders in the solids, fluids, or both.

Caustic—A name given to such substances as destroy the texture of the parts to which they are applied.

Cautery—Is either actual or potential. The actual cautery is hot iron; the potential is caustic substances.

Cavernous—Any thing that is hollow; as the body of the penis.

Cava vena—The large vein which receives the reflux blood, and conveys it to the heart. It is described as two; the ascending and descending, part being above the heart, and part below it.

Cellular membrane—It is likewise called *tela cellulosa*. *Paniculus adiposus*. This membrane is of a cellular substance, and is made

made up of an infinite number of little plates or scales, which, by their various directions, form small cells and web-like spaces, and join together all the parts of an animal body in such a manner as not only to sustain, but to allow them a free and ample motion at the same time. This membrane is of the greatest extent, and of the utmost consequence in the structure of the animal body.

Cellular—Made up of small cavities or cells.

Cephalics—A name given to those remedies against disorders in the head.

Cerebrum—The brain. The whole mass of which is divided into the cerebrum and cerebellum. It consists of two substances, the cortical or cineritious, and medullary.

Cerebellum—The back part of the brain ;
or,

or, in our subject, the upper part. Some call it the little brain.

Cervical—Nerves which pass through the vertebræ of the neck.

Chalybeate—Partaking of iron, or impregnated with it. Water impregnated with iron is called chalybeate water.

Chemistry—Is the art of combining or separating the constituent parts of bodies by fire and mixtures. It is a very important branch of natural philosophy, and has for its objects the properties of bodies, which it discovers by analysis and by combinations, and explains the intimate and reciprocal action of all bodies in nature on each other.

Chemical—Any thing that relates to chemistry or belongs to it.

Chest founder—A term in farriery, and very improperly applied to any inflammatory disorder within the thorax.

Chine

Chine, mourning of—Or mourning of the chine *; a very unintelligible term in farriery, which has been applied to the glanders in horses in the last stage of that disorder, when the discharge from the nostrils became of a blackish colour; and, as it was then supposed that it was the spinal marrow that was discharged from the chine or spine, it was called the mourning of the chine.

Choroid—A name given to several membranes, which, on account of the multitude of their blood-vessels, resemble the chorion.

Chorion—The name of the external membrane of the foetus. It has its name from the *chorus* or crowd of blood-vessels which are spread all over it.

* Our plan obliges us to insert these absurd terms; and, what is still worse, to define them when practicable. It were much to be wished, that all such unmeaning terms were exploded entirely from the art.

Chronic

Chronic or *chronical*—This term is applied to those diseases that continue long, without any acute or recent symptoms taking place, and are thus called to distinguish them from those diseases which proceed rapidly and soon terminate in death or recovery, and which are called acute.

Crystalline lens—One of the humours in the eye ; so called, because it resembles crystal.

Chyle—The white juice formed in the stomach by digestion of the aliment. It is the nutritious part of the food ; which, being absorbed or sucked up by the lacteal vessels in the intestines, is carried into the circulation and converted into blood.

Cicatrix—A seam or elevation of callous flesh rising on the skin after the healing of a wound or ulcer.

Cilia—The extreme parts, or edges of the eye lids, with long hairs fixed in them.

Ciliary—A name given to certain glands and ligaments on the inner edge of each eyelid. Ciliary ligament, called *processus ciliarus*, is a range of dark coloured fibres in the eye.

Cineritious—Substances of an ash colour. Thus, the cerebrum is called the cortical or cineritious part of the brain.

Circulation—This term is applied to the circulation of any fluid through the vessels destined for its conveyance; but, properly speaking, the term circulation is only applied to that of the blood, because it moves from the heart to return to it again, as it were forming a circle.

Coagulation—Is when a fluid, or some part of it, is rendered more or less solid.

Coats

Coats—The outer coats or coverings of vessels, &c.

Cohesion—Is that wonderful property impressed on matter, by which its elementary parts, when they approach each other to a certain degree, rush into contact with each other, and remain in that state until they are disunited by a force superior to their attractive power.

Colic—Pains in the belly, which may be either inflammatory, flatulent, spasmodic, or bilious.

Colon—The name of one of the large intestines.

Colt evil—A term in farriery, which is a frequent erection of the penis in young high fed horses, and, by rubbing it against the belly, produces a discharge of semen. This term is likewise applied to any discharge

charge of matter from the penis through the urethra.

Coition—The act of venery.

Coma—A degree of apoplexy in which the loss of sensation is not considerable.

Concussion—Is a sudden jolt or shock of the brain by blows, &c. which may occasion a suspension of its faculties, or a total abolition of them.

Concoction—Digestion of the food. In surgery, that operation of nature upon morbid matter which renders it fit to be discharged from the healthy fluids, as in wounds, &c.

Concrete—Is the growing together of any parts in the body, which are separated in a natural healthy state.

Condense—An inspissation or thickening of any sort of fluid, whether in or out of the body.

Con-

Condiment—Things used in preparing aliments, whether to render them palatable or to assist their digestion.

Condition—The state, habit, or constitution of the body.

Conductor—An instrument in surgery, whose use is to conduct the knife in some operations.

Congelation—That change which is produced by cold upon fluid bodies, and by which they become solid. Also any disease which may be supposed to arise from cold.

Congestion—A collection of matter: A swelling which rises gradually, and ripens slowly, in opposition to those tumours which are soon formed and soon terminated.

Conglobate—The name given to some glands that are singly gathered into the shape

shape of a ball. Thus, a conglobate gland is a little single smooth body, wrapped up in a fine skin, by which it is separated from all other parts, only admitting an artery and a nerve to pass in, and giving way to a vein and excretory canal to pass out. Of this sort are the glands of the brain and of the testes.

Conglomerate—Is likewise the name of certain glands which are composed of many little conglobate glands all tied together in clusters, and wrapped up in one common membrane.

Conjunctiva tunica—Is that tunic or coat which makes the white of the eye.

Consumption—Is generally applied to that wasting of the body which proceeds from the absorption of purulent matter from the lungs. It is likewise called *phthisis pulmonalis*.

Con-

Constipate, constipation—Costive, or what is called bound in the body. This may happen when the excretion from the intestines is not regular, but also when what is discharged is too hard to receive its form from the impress of the rectum.

Constitution—The natural temperament peculiar to different constitutions or habits of body.

Constriction—Shutting up the pores of the skin from cold or any other cause.

Contact—The meeting of two bodies that they touch each other.

Contagion, or infection—Are such diseases as are said to proceed from one diseased animal infecting another of the same species with the same malady, either by contact, or by the effluvia passing from the diseased to the sound body.

Con-

Contraction—An immobility of any of the joints, induced by a preternatural contraction of some of the muscles destined in a natural state to move them, or from some derangement of the osseous or ligamentous parts about the joint affected; likewise a contraction of the hoofs in horses.

Contusion--A synonymous term for a bruise, either attended with a wound or not.

Convulsion—Is an involuntary contraction of the muscles, and which may be either partial or general, according to the violence of the cause from which they may proceed.

Converging—Rays tending to one point.

Cor—Is a term used in different sciences; but in anatomy, it means the heart.

Core—In farriery, a piece of dead or mortified flesh that separates from the sound parts

parts in the heels of horses in the winter season, leaving a large hole or opening. Caustic substances introduced into the openings of sinous or fistulous ulcers, by destroying the texture of the parts, have the same effect, and are called coreing out the sinus or fistula.

Cornea—A coat of the eye ; which is also called *sclerotica*. It is the first coat which is proper to the eye. It is strong, thick, and tendinous. The fore-part of this coat bearing a resemblance to transparent horn, from which it takes its name of cornea. The rays of light are transmitted through the cornea into the eye.

Coronet—In farriery, the upper part of the hoofs of horses, where the hair terminates.

Coronary—A name given to some ligaments, vessels, &c. from their particular
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situation when surrounding any part in the manner of a crown, as the coronary vessels on the base of the heart.

Corpuscle—Very small bodies, or an atom.

Corrosive—Corroding medicines, which destroy the texture of the parts they are applied to.

Coroborants—Strengthening medicines.

Cortical—The cortical substance of the brain.

Corrugation—The folding of the skin into wrinkles.

Corruption—The decay or solution of the parts of any substance.

Cortex—The name of many drugs, which consist of the bark of trees or of roots.

Cor-

Coruscation—Flashing, shining, or light produced by the collision of two hard bodies.

Costæ—The ribs surrounding the thorax.

Cramp—A sudden convulsion of the muscles, or any organ affected by it.

Cranium—The skull, which incloses the brain.

Crápula—A surfeit of food taken into the stomach. It sometimes signifies eruptions on the skin from obstructed perspiration.

Crisis—The quality of the blood peculiar to every constitution.

Crassamentum—The thicker parts or red globules in the blood.

Cretaceous—Any chalky substance.

Crisis

Crisis—Is the termination or change of a disease, either by recovery or death.

Crown scab—In farriery, a disease that takes place on the coronet, immediately above the hoof, and which is an oozing of a thin ichorous matter through the pores of the skin, of a very foetid smell.

Cruor—Belonging to the blood. Sometimes it is applied to congealed blood, sometimes to the blood in general, and sometimes to the venal blood only.

Crudity—Undigested substances in the stomach, or humours of the body.

Crust—In farriery, the shell, or outer walls of the hoofs of horses, where the nails are drove in shoeing.

Cryptæ—Hollow places, like cavities, containing some fluid.

Curb

Curb—In farriery, a callous substance that grows on the back part of the hock joint in horses.

Curtailing—In farriery, cutting off the tail from a horse.

Cutaneous—Belonging to the skin.

Cutis—The true skin. It is a strong, thick, universal covering of the whole external parts of the body. It is composed of a close cellular texture of fibres of various kinds, and covered externally with a thick coat of hair.

Cuticle—The scarf skin. It is likewise called the *epidermis*, because it is placed on the true skin as a covering. It is of a more compact texture than the true skin, and full of pores, for the evacuation of what transpires through them from the body. It is
this

this cuticle or skin that rises on the application of blisters.

Cutaneous—Belonging to the skin.

Cystic—A name applied to certain ducts, arteries, and veins in the liver.

Cystis—A bag or bladder, or the receptacle of morbid humours.

Cynanche—A name of several kinds of quinsey, or inflammation of the parotid glands; so called, because dogs are said to be liable to it.

D.

Debility—Weakness, feebleness, infirmity.

De-

Decoction—The act or operation of boiling.

Deflagration—Burning, or the consuming the combustible parts of a substance by fire, or the calcination of metals.

Defluction—The flowing down of morbid humours upon any inferior part, as in a catarrh, &c.

Deglutition—Is the action of swallowing the food or drink, by the united force of the muscles of the throat, together with that of the tongue, &c.

Deliterious—Pernicious, hurtful, or poisonous.

Deliquation—The solution of any body when exposed to air, as salts, &c. ; also the melting or reducing any solid substance into a liquid state by the application of heat.

De-

Delirium—Alienation of mind ; roving in fevers ; light headedness.

Deltoid—The name of a muscle.

Demulcents—Such medicines as sheath or blunt the acrimony of the humours, and render them mild. Emollients are of this class.

Dentes—The teeth. They are made up of a bony substance and an enamel. They are divided into three classes ; the incisores, canini, and molares.

Density—Closeness or compactness of any body or substance.

Dentition—Breeding of teeth.

Deobstruants—Such medicines as open obstructions. They are sometimes called aperients.

Deri-

Derivation—Is when any humour, which cannot be conveniently evacuated at the part affected, is attracted or drawn from thence and discharged elsewhere.

Detergents—Such medicines as deterge or cleanse abscesses or ulcers of such viscid humours as adhere to and obstruct the vessels.

Determination—In physiology, means, that certain proportion of humours transmitted to each organ in the body, not only with respect to its quantity, but the degree of motion with which it is conveyed to each part, in a healthy state. In inflammatory cases, the blood seems to be determined to the inflamed part with great force.

Diabetes—Is a profuse discharge of urine at short intervals.

Diagnosis, diagnostic—The signs of a disease.

case. They are of two kinds, viz. the adjunct and pathognomonic. The adjunct are common to several diseases, and serve only to point out the difference between diseases of the same species. The pathognomonic are those which always attend the disease, and distinguish it from all others.

Diapente—In medicine, a composition so called because it consists of five ingredients.

Diaphoretics—Medicines which promote perspiration.

Diaphragma—That strong membrane which divides the thorax or chest from the abdomen. It is also called the midriff.

Diarrhœa—Is a flux, or purging, when the intestines are solicited to a too frequent discharge of their contents.

Di-

Diastole—Is that motion peculiar to the heart in its first vibration, when it dilates to receive the blood from its auricles or ears, and then contracts and throws the blood into the arteries. This latter motion is called its systole. Hence these two motions are expressed by the short words of diastole and systole.

Diathefis—An affection, or a disposition, as when the blood is inclined to some faulty state.

Digestion—In the animal œconomy, is the conversion of the food or aliment into chyle or nourishment. In surgery, it means the suppuration of matter or pus well digested from a wound or ulcer. It is likewise applied to certain operations in pharmacy.

Dilation—Opening, widening, or extending. It is sometimes used for diastole.

Di-

Diluents—Whatever, on being mixed with a fluid, renders its parts more fluid; therefore, the diluent must be a fluid more fluid than that with which it is to be mixed.

Diploe—It is the soft porous part between the two plates or tables of the bones of the skull.

Dispensatory—The place where medicines are prepared, or a book treating of the composition of medicines.

Diffolvents—Medicines which dissolve concretions in the body.

Diffolution—Dissolving; breaking down; death.

Distention—Simply signifies dilatation, or opening, as when the vessels are too full of blood they are said to be distended.

Dif-

Dissection—To cut up; to dissect; the cutting up a body with a view of examining the structure of its parts.

Discutients—Are such medicines as by their subtilty dissolve a stagnating fluid, and dissipate the same without an external solution of continuity.

Distemper—A disease, when general in one part of the country, or a certain district, is, by way of eminence, called the distemper. Thus, the distemper amongst horses; the distemper amongst the horned or black cattle.

Disease—May be defined such an alteration of the properties of the fluids, or solids, or of their organization, or of the action of the moving powers, as produces an inability or difficulty of performing the functions of the whole or any part of the system. Diseases

eases are divided into two classes, the acute and chronic.

Diuretics—Medicines which provoke a discharge by urine.

Domestic—When applied to animals, signifies those that are kept and fed at home, to distinguish them from those that are wild.

Drastic—Purging medicines of a violent quality, and strong in their operation.

Dropfy—A collection of water in any part of the body, and bears different names according to the part affected.

Duct, or canal—This term is frequently applied to parts of the body through which particular fluids are conveyed, and bears different names according to their situation. Thus, an excretory duct is a canal containing a fluid different from red blood, and is almost

almost always the outlet of a gland or some glandular substance. The intestines are likewise called the alimentary canal.

Duodenum—The name of that intestine which begins immediately at the right orifice of the stomach.

Dura mater—That membrane which lines the inside of the skull.

Dysentery—Bloody flux, or a frequent discharge of blood in the stools, accompanied with griping pains, and followed with a tenesmus.

Dyspnea—Difficulty of breathing.

Dysury—Difficulty of voiding the urine.

Dyspepsy—Depraved digestion, as when what is digested becomes of a morbid quality.

E.

Earth—One of the simple substances formerly called elements; several kinds of are used as medicine.

Ecchymosis—This term is applied to bruised parts, and is an effusion of blood and humours from their respective vessels. Thus, when by the violence of a blow, or pressure of any heavy object, the small veins on the part are broken, and the blood is gradually discharged from them. This blood is collected under the skin, and is called ecchymosis, the skin remaining entire at the same time. In the human body, this is easily distinguished by the blackness of the parts affected; but in our subject, whose skin is covered with a thick coat of hair, it can only

only be known from the tumor and swelling of the parts.

Effervescence—A slight degree of ebullition in liquors, which takes place, or is excited, by mixing any acid substance with an alkaline.

Effluvia—Minute particles which exhale from corrupted and other bodies, and which float in the air. By the effluvia from morbid bodies contagious diseases are propagated.

Elasticity—Is that property in bodies by which they restore themselves spontaneously to the figure and dimensions which they had lost by the action of some other body applied to them.

Element—The elementary or simple parts of which the animal body is composed, and may be defined to consist of the most

minute and simple particles, as those of fire, air, water, and earth.

Elephantiasis—A species of leprosy ; so called from incrustations covering the skin ; also a disease affecting the legs, in which they grow thick, resembling those of the elephant.

Embrio—The beginning foetus.

Emetic—Medicines which provoke vomiting. They likewise determine the perspirable matter to the surface of the body, and promote sweat.

Emollients—That class of medicines which are said to relax and supple the solids. They also sheath or blunt the asperity or sharpness of the fluids.

Emphysema—Means any flatulent tumor which is soft to the touch, arising from air being admitted into the cellular membrane.

Em-

Empiric—An appellation bestowed on quacks, who, without knowledge in their profession, pretend to perform miracles by some desperate nostrum.

Empyema—This term is applied to a collection of matter in the cavity of the breast.

Empyreuma—That offensive taste and smell which distilled waters and other substances receive from being too much exposed to the action of fire.

Emulcents—The name of those arteries and veins which go from the aorta and vena cava to the kidneys.

Emunctory—A term applied to those passages in the body by which superfluous matters are evacuated.

Encephalon—The cavity of the head, which contains the dura and pia mater, the
cere-

cerebrum, the cerebellum, and the medulla oblongata.

Encephalus—The brain by itself.

Encysted—A tumor inclosed in a bag or vesicle.

Enema—Aglyster, or any kind of medicines injected into the anus.

Enteritis—An inflammation of the bowels.

Ephemera—A fever of one day's continuance.

Epidemical—A name given to those diseases which are more or less general, or prevalent in one part more than another, and attack people or many animals at the same time.

Epidermis—The cuticle or scarf skin.

Epi-

Epigastric—A term applied to certain arteries and veins. It is likewise applied to the region of the stomach and parts adjacent.

Epiglottis—The aperture or opening of the larynx or windpipe.

Epilepsy—The falling sickness; so called, because the patient falls suddenly to the ground.

Epiphysis—A small bone annexed to a larger by means of an intervening cartilage.

Epiplasma—A poultice.

Epiophora—A term applied to any violent or impetuous flux of humours to any part of the body, but more particularly to the eyes, when the tears trickle down the cheeks, in consequence of obstructed puncta lachrymalia,

malia, which hinders them from being conveyed into the nose by that passage.

Episthotones—A spasmodic convulsion ; a rigidity of the whole body.

Epulotics—A name given to medicines which dry up the moisture of wounds, and dispose them to be covered with skin.

Epiploon—A name frequently given to the omentum, because it seems to float upon the intestines.

Error loci—An error of place, either in the solids or fluids of the body.

Errhines—A name given to those substances which, when snuffed up the nose, promote a discharge of mucus. They are likewise called sternutatories.

Ery-

Erysipelas—St Anthony's fire ; by some called the rose.

Eruetation—Belching, or the breaking of wind from the stomach.

Eruption—A breaking out, or a sudden appearance of pustules on the skin.

Eschar—In surgery, is a hard crust or a scab on the flesh, formed by the application of a red hot iron ; a caustic, or some sharp corroding humour of the body ; a crust or scab on the flesh ; a scar.

Escharotic—Medicines so called, which, when applied to the flesh, form a hard crust or eschar, that skin over a wound.

Essence—In medicine, the chief properties or virtues of any simple or composition collected into a narrow compass.

Es-

Essential—An epithet given to certain preparations of salts and oils.

Ethmoid—The name of a bone which is placed at the back and upper part of the frontal sinus, between the two orbits of the eyes. It is a sieve like bone, and generally much affected in that disease called the glanders in horses.

Evacuation—Any discharge from the body.

Evaporation—Is a dissipation, drying, &c. of the finer parts of any fluid, by means of the heat of the sun or of fire.

Event—The termination of a disease either in health or death.

Exanthemata—Any kind of pustules or eruptions on the skin.

Ex-

Excrecence—Any thing which grows preternaturally upon any part of the body.

Excretory—A name given to certain ducts or canals which secrete any humour from glands.

Excreta and retenta—The former means things that are cast out of the body ; the latter, things that are retained.

Excision—The cutting off any extraneous or morbid part.

Exfoliation—That process in nature by which the dead parts of a bone separates from the sound.

Exercise—Moderate labour or exercise of the body, for the benefit of health.

Excoriation—An abrasion or loss of skin.

Excrement—Whatever is discharged, or requires to be discharged as noxious, useless, or corrupted, from the natural passages of the body.

Exostosis—Is a preternatural excrescence of a bone, or a tumor on a bone.

Exotic—Means any thing brought from a foreign country.

Expectorants—Medicines which promote a discharge of mucus from the lungs, or from the wind-pipe.

Expiration—Is the action of discharging the air from the lungs that has been drawn in by inspiration.

Expression—A mechanical operation by which the juices of plants, &c. are obtained.

Extenuation—Wasting, or great leanness of body by disease.

Ex-

Extensors—This name is given to several muscles, whose office is to extend the parts to which they belong.

Extravasation—This is applied to any of the fluids of the body which are out of their proper vessels.

Extremities—The most remote parts of the body.

Exuvia—Sloughs or skins thrown off from any part of the body.

Exulceration—Beginning erosions, which wear away the substance and form an ulcer.

F.

Faculty—In animals, is the power of performing any action of the body. In man, they are far more extensive.

Fames—Hunger. When animals die for want of food, their death is not directly the consequence of hunger, but by that kind of fever which is called putrid, and which is excited by the blood's losing its bland consistence, from the want of the usual supplies of nourishment.

Farina—The powder of meal or flour.

Fat—An animal oil, too well known to require any description.

Farcy

Farcy—A loathsome disease to which horses are subject, beginning with hard knots and pustules which sometimes spread over the surface of the whole body, and terminates in foul ulcers, attended with swelling of the parts.

Fauces—The jaws or throat.

Fæces—Excrement discharged from the body.

Febris—Fever. Fevers are divided into a number of species ; as the inflammatory, the nervous, the putrid, &c. Fever seems to be a general disorder of the whole animal system, and may be defined a symptom of some disease either manifest or latent, attended with particular symptoms peculiar to fevers in general, as great heat, disordered pulse, &c. which attend them in their various stages.

Fe-

Febrifuge—Medicines recommended in fevers.

Fermentation—Certain changes produced in saccharine vegetable substances, whereby vinous spirits are produced.

Ferrum—Iron. A metal well known for various purposes, on account of its malleability. It is likewise used as a medicine : the preparations of it are called chalybs or chalybeate.

Fibre—In anatomy, means a small thread or filament without a cavity, or at least without a visible cavity, whose breadth and thickness bears a very small proportion to its length.

Fire—The element of fire, which, like air, pervades all bodies, whether animate or inanimate, and bears a part in their composition.

position. In animal bodies, it is the cause of heat, being absorbed by the lungs from the air into the blood on inspiration.

Fimbria—Any thing that is jagged or fimbriated on the edges, like to the leaves of trees.

Filament—A body appearing in the form of a slender thread.

Fissure—Means a crack or opening, or a seam in any part.

Fistula—Is a kind of ulcer with a narrow orifice, which, together with its internal surface, is for the most part callous.

Flatulency—Air or vapour rarified by the heat of the parts in which they are confined, causing distension and pain.

Flexor—A name applied to several muscles,

cles, from their office, which is to bend the parts to which they belong.

Flux—May either mean a discharge from the body, or sometimes a flow of humours to any part.

Fluids—The term fluids is applied to all those liquids in an animal body, which, in a healthy state, readily admit of a change of place, whether by circulation, secretion, or excretion ; each of which are distinguished by a particular name, as lymph, serum, sweat, urine, &c. Some are clear and colourless, others more or less tinged ; some are salt, and others insipid.

Fætus—The young of all viviparous animals whilst in the womb.

Follicle—A little bag which contains matter.

Fo-

Fomentation—A partial bathing with warm water or other warm liquors.

Foramen—A term frequently met with in anatomy, and signifies a hole or opening.

Formulae—A prescribed or general form. A technical term in medicine.

Friction—Rubbing. A necessary operation to the skin of horses.

Fumigation—The application of medicines to the body in fumes or smoak; they are inspired into the lungs, for curing certain diseases there, and used as a preventative in contagious air.

Functions—The actions or functions of the body are the determinate action or operation of any organ by which it contributes to the support of life and health. The functions of the body are divided into the

vital, natural, and animal. The vital functions are those which are absolutely necessary for life. The natural functions are those which are employed in the preparation and distribution of nourishment, &c. The animal functions are those that are performed by the will, as muscular motion, and all the voluntary motions of the body ; likewise the senses of touch, taste, smell, sight, hearing, &c.

Fungus—A spongy excrescence which arises in wounds and ulcers, commonly known by the name of proud flesh.

Furor uterinus—A preternatural irritability of the uterus and pudenda in females at certain seasons of the year. They are then said to be in season for the male.

Fusion—The reduction of solid bodies into a state of fluidity by fire.

G.

Ganglion—In anatomy, means a knot frequently to be met with in the course of the nerves; for, wherever any nerve sends out a branch, or receives one from another, or where two nerves join together, there is generally a knot or ganglion. It is likewise called a plexus.

Gargle—A liquor with which the throat is washed when it is inflamed or ulcerated.

Gas—Any elastic aeriform fluid.

Gangrene—A beginning mortification.

Gastric

Gastric—The name of certain arteries and veins about the stomach.

Gastric juice—Is a thin pellucid juice which distils from certain glands in the stomach for the digestion of the food.

Gelatinous—Any thing of the consistence of jellies, gums, or mucilage.

Generation—The act of begetting or producing.

Gestation—Is the progress of the foetus from the time of conception to that of birth.

Gland—Is, in general, an organic substance of a circumscribed figure, framed so as to separate from the blood a liquid different from and unlike the blood. There are glands of various kinds, some more simple, others more complicated, and which bear

bear different names. Glands are roundish bodies, seated in the cellular membrane, generally near the large vessels; their substance is firm, and of various colours.

Glanders—A disease in horses, attended with a preternatural discharge of mucous matter from the nose, and a swelling of the maxillary glands.

Glans—The extremity of the penis.

Glottis—Is the narrow slit at the upper part of the aspera arteria or windpipe, and is covered by the epiglottis when the breath is held in, and when the food passes over it to be swallowed. The glottis modulates the voice.

Gluten—Is that glutinous substance which is said to keep earthy parts of bones, &c. together. In very young animals, as in the fœtus, this gluten is supposed to form about two thirds of the substance of the bones;

bones; and in animals more advanced, nearly one half of the bones are gluten. This gluten is principally composed of oil and water.

Gramen—Grass, the common herbage for cattle, and one of the best solvents for those concretions that are formed in the stomachs of these animals, on their being long fed on dry food, and also for correcting the blood and juices; of which we have daily experience, in its renewing both solids and fluids in poor emaciated cattle.

Granulation—The rising of the fleshy parts in ulcers, in a healing state, when they are said to granulate new flesh. It means also the reduction of metals into small grains.

Gravel—Any hard gritty matter like sand, frequently found in the kidneys and bladder, and discharged by urine.

Gristle

Gristles or *cartilages*—Are solid, smooth, white elastic substances, which cover the ends of jointed bones. They are between the hardness of bone and that of a ligament.

Grumous—Any liquor that is thick or cloated,

Gustus—The taste upon the tongue. This sense is performed by the papillæ on the tongue, which are very prominent in hungry animals, when the tongue is put out to taste any body. In dead animals, these almost disappear.

Gutta serena—A disease in the internal part of the eye.

H.

Hæmatites—Blood stone; so called from its supposed virtue of stopping blood.

Hæmoptysis, hæmoptoe—A discharge of blood from the lungs.

Hæmorrhagy—Implies a loss of blood, whether from a spontaneous discharge from the blood-vessels, or from external accidents.

Hæmorrhoids--The piles in the human subject.

Hæmorrhoidal—The name of certain arteries and veins about the anus.

Hæmostasia—A general stagnation of blood from a plethora.

Hair

Hair—The external covering of the bodies of all quadrupeds. The hair, hoofs, claws, and horns, are appendages of the skin. From the appearance of the hair, which is called the coat of animals, we can form a pretty exact opinion of the good or bad habit of the body.

Hectic—An epithet for that species of fever which accompanies the absorption of pus or matter into the circulating system.

Helix—One of the external parts of the ear.

Hemiplegy, or *hemiplegia*—A palsy, in which one side of the body only is affected.

Hepatic—This term is applied to any thing belonging to the liver.

Hepatic ducts—Of which there are two, the cystic and hepatic. The cystic, in the human body, contains part of the bile in

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the gall-bladder ; but in horses, who have no gall-bladder, the bile flows constantly through the hepatic duct into the duodenum.

Hepatitis—An inflammation of the liver.

Herbs—Such plants whose stalks die every year. Those whose roots continue only one year are called annual ; those who continue two years are called biennial ; those who continue many years are called perennial.

Hermetic seal—In chemistry, is the closing or shutting up the mouth of any vessel with care and exactness, to prevent evaporation, or the access of external air.

Hermaphrodite—One who is supposed to be of both sexes.

Hernia—An opening or rupture where
part

part of the abdominal contents are forced through the interstices of the muscles.

Herpes—Tetters ; those disorders that creep and spread on the skin.

Hippomanes—That fleshy substance which sometimes adheres to the forehead of a new foaled colt.

Homogeneous—All of a kind, or uniform body or mixture.

Humour—Is a general name for any fluids in the body ; but, in a morbid state, it is applied to those disorders attended with vitiated or extravasated fluids.

Hydatids—A name given to those transparent bags which are sometimes found, on dissecting bodies, adhering to the different viscera, as the lungs, liver, &c. They contain serum or coagulable lymph.

Hy-

Hypochondria—That part of the abdomen on both sides which lie under the spurious or false ribs.

Hypogastric—Is the lower region of the fore part of the belly.

Hydrargyrus—Quicksilver, or the preparations of mercury.

Hydrocele—A dropfy in the scrotum, and is a species of anasarca, to which horses are very subject.

Hydrops—A dropfy, which bears different names, according to its situation in the body or part affected.

Hydrophobia—A name given to that species of madness caused by the bite of a mad animal.

Hydrothorax—A dropfy in the thorax or chest.

I.

Ichor—Also called sanies. It is a thin but acrid fluid, which distils from wounds, ulcers, or from the pores.

Icterus—The jaundice ; a disease which proceeds from a vitiated state of the blood and humours, from the bile regurgitating, or being absorbed into it, by which the functions of the body are injured.

Idiopathy—A primary and peculiar affection of any part.

Idiosyncrasy—Every individual, both of men and animals, have a state of health peculiar

cular to themselves ; and as individuals seem to vary from each other both with respect to the solids and fluids, although each may at the same time be in a sound state of health, this forms a peculiarity of constitution, which is called idiosyncrasy, or peculiar temperament.

Ignis—The Latin of fire. That element which, like air, pervades all bodies, whether animate or inanimate, and makes up a certain portion of their constituent parts.

Ilium—A name of one of the small intestines. It is likewise applied to certain bones in the neighbourhood of these intestines.

Impregnation—Implies the female being impregnated by the male. Impregnation of plants, &c.

In-

Incisores—The name of the anterior teeth in each jaw, from their use in cutting the food.

Incrustation—In surgery, is the forming of a crust or eschar upon any wounded part.

Indication—Is a conclusion arising from reasoning on particular symptoms or signs of disease. The indication of cure in all diseases is to remove the proximate or immediate cause.

Indigestion—An improper concoction of the food or humours.

Inertiæ vis, or *vis inertiæ*—Means when the powers of the constitution are torpid or inert, and, for want of their exertion, leave the habit, both solids and fluids, in a state almost of inactivity.

Ino-

Inominata—A term applied to some arteries, nerves, &c. because they have had no proper name fixed to them. The large bone which forms the upper or back part of the pelvis, although composed of three bones, is called *ossa inominata*.

Infection—Contagion, or any thing said to be infectious.

Inflammation—Is an accumulation of blood to any part of the body, whether external or internal, local or universal, by an increased circulation of the blood, from various causes. The principal effects of inflammations are heat, pain, swelling, an accelerated pulse, a dryness of the skin, and itching.

Infusion—Is steeping any ingredient in a proper fluid, or any medicine that has been prepared by this action.

In-

Inguinal—The name of any thing belonging to the groin, as the glands, &c.

Injection—This term is applied to glysters or clysters, by which medicines in a liquid state are conveyed to the most latent cavities of the body, by means of proper instruments. In anatomy, the term injection means the filling up of the blood-vessels, &c. with coloured wax or varnish, in order to trace out their course, shapes, and ramifications throughout the body. Quicksilver is likewise employed for the finer vessels.

Induration—Means any gland or fleshy substance growing hard.

Indigestion—Food or aliment not digested in the stomach.

Indolent—This term is applied to tumors that are very slow in coming to maturity,

turity; hence they are called indolent tumors.

Inspiration—Is the drawing in of air into the lungs.

Insufflation—The taking away the humid or watery parts from any substance by evaporation.

Integuments—The outward sheath or covering of parts, such as the cuticle, rete mucosum, cutis, and the cellular membrane.

Intercostal—Any thing between the ribs, whether muscles, arteries, veins, or nerves.

Intermittent—Is when a fever quits the patient for a time and then returns.

Interstices—A space between the muscles.

In-

Introsuception—Is a preternatural ingress of one portion of an intestine into another, or a reduplication of the intestine.

Intestines—Likewise called the guts. They are divided into the small intestines and the great. The small are the duodenum, jejunum, illium. The great are the cæcum, colon, and rectum.

Iris—The fore-part of the choroid coat in the eye is so named, because of the variety of its colours.

Irritability—Is applied both to the healthy and morbid state of the body. Thus, irritation is a species of stimulus, exciting to action in the healthy state, as in the muscular fibres, when excited to motion by the will of an animal. Irritation, in a morbid or diseased state, implies something acrid or sharp. Irritating the parts, for instance, a
mot

mot in the eye produces an irritation on the parts, so as to produce inflammation. Certain medicines irritate the bowels to throw off their contents by stool, and which may be followed by spasm, convulsion, inflammation, and gangrene. Irritation is likewise produced by an overfulness or overstretching of the vessels or viscera; and this distension, or continued irritation, followed by inflammation, attended with any considerable degree of violence, produces fever, attended with a quick pulse, &c.

Ischury—Is a stoppage or suppression of urine.

Issue—In surgery, is an opening made under the skin, in order to create a discharge of matter.

Inbale—Is the drawing into the lungs
any

any thing that is without the body, whether air or vapour.

Inflation—Means to inflate or blow up with air ; or any flatulent tumor, arising from air or wind admitted into the cellular membrane.

Inorganic—Not properly formed.

Inosculation—The union by conjunction of the extremities of vessels, as the inosculation of the arteries with the veins.

Influenza—Epidemic catarrhal disorders, attended more or less with fever.

J.

Jaundice—A disorder in the liver.

Jalap—A species of the convolvulus; the root of which is of a purging quality.

Jecur—The liver. It is also called hepar. This viscus lies immediately below the diaphragm, on the right side, is divided into lobes. The office of the liver is to secrete the bile from the blood.

Jugular—A name given to the large veins in the neck.

Jejunum—The small intestines which begins where the duodenum ends.

Ju-

Juvantia and *lædentia*—Two technical terms used in medicine. The former implies, whatever relieves under a distemper, whether food or medicine. The latter, whatever offends or is found hurtful.

Jesuits bark—Likewise called Peruvian bark ; a medicine of great use in any tendency to mortification, and a great strengthener of the stomach, and one of the best medicines called tonics.

K.

Kali—A sea-weed growing on the sea-coasts, called also kelp, from which an alkaline salt is obtained by burning.

Kidneys—Are two roundish oblong flattened bodies, situated on the lumbar vertebræ, or small of the back. Their office is to secrete the urine from the blood ; after which, it is conveyed by the ureters into the bladder.

L.

Labia—The lips.

Labyrinth—The second cavity of the ear.

Lac—The Latin of milk ; a fluid which is prepared and secreted in the bodies of animals, but not completely elaborated into an animal nature. It differs very little from the chyle when it is taken up by the lacteals.

Lactea febris—The milk fever, which frequently attacks women soon after delivery. Cows are likewise subject to it when cruelly kept up in order for sale to make a great show of milk.

Lachrymal—The name of certain glands, ducts, and nerves about the eyes.

Lædentia—Medicines or substances which injure the health or exasperate a disease.

Lacunæ—Any drain or furrow, as the excretory ducts and glands in the vagina and urethra.

Lactea vasa—The lacteal vessels. The absorbents of the bowels, that suck up the chyle or nourishment from the food, and convey it to the thoracic duct ; from thence it is carried to the blood.

Larynx—The upper part of the wind-pipe, called aspera arteria.

Laudanum—Preparation of opium in spirit of wine.

Lamina or *lamella*—Thin plates.

Languor

Languor—Lowness ; debility of spirits.

Laxatives—Gentle purgatives.

Lentor—A viscosity or fizziness of the fluids ; a sluggishness of circulation.

Leprosy—A disease of the skin.

Leanness—Meagre, or thin of flesh.

Lethargy—Is an heaviness and perpetual disposition to sleep. This disorder is generally symptomatic, and often the attendant of fever.

Lens—The name of one of the humours of the eye, called the crystalline lens.

Levators—The name of certain muscles. They are likewise called elevators from their offices.

Leucophlegmatic—Phlegmatic or watery swellings ; frequently the beginning of anasarca.

farca. Sometimes this word is used for emphysema. Leucophlegmatic means likewise that habit of body when the patient is much subject to oedematous swellings in the legs.

Lientary—Is a species of diarrhœa, in which the aliments are hurried through the body in a nearly indigested state.

Ligament—Is a white, tough, flexible body, thicker and firmer than a membrane, and not so hard or solid as a cartilage; They have no cavity nor hollowness in their substance, little elasticity, and stretched with difficulty. They serve to articulate the bones on the joints. There are likewise annular ligaments, which bridle the tendons of the muscles which pass through them in different parts of the body.

Ligature—A bandage, or any thing tied round a limb.

Lingual

Lingual—Any thing about the tongue, whether ducts, glands, nerves, arteries, &c.

Lithiasis—The gravel or stone in the bladder or kidneys.

Lithotomy—Cutting for the stone.

Lixivium—A ley, or water impregnated with the salts of burnt vegetables.

Lochia—Purgations of the uterus after birth.

Local—Diseases that have their seat in one particular part of the body only.

Lotion—An external fluid application to any part.

Lobules—Small divisions or lobes. Lobes of the lungs. The small cells of fat are called lobuli adiposi.

Lumbral

Lumbral—The name of the back bone, or lumbral vertebræ. The arteries, veins, nerves, and muscles belonging to them are called vertebral.

Lumbrices—The long earth worm. A species of these vermin infest the bowels both of men and animals.

Luxation—A dislocation of the bones from their sockets.

Lubricate—To make slippery or smooth.

Lungs—The organ of inspiration and expiration.

Lymph—Is a pellucid, insipid, pure liquor; the more subtile parts of which affords the matter of the fluid of the brain, spinal marrow, nerves, and also the feminal fluid. The gelatinous parts of this fluid nourish all the solids of every kind; and
its

its finer aqueous parts are carried into the blood by the lymphatic vessels.

Lymphatics—Certain vessels which absorb or take up fluids from every part of the body, and convey them to the thoracic duct; from thence they are conveyed into the blood.

M.

Maceration—The infusing or soaking ingredients in water or other fluid to extract their virtues.

Malignity—Malignant ; a term given to particular fevers.

Mania—Madness ; delirium in fevers ; or communicated to the system by the bite of mad animals, as dogs, &c.

Mamillary—Belonging to the breasts.

Marasmus—Is a wasting of the body, in a consumption, or last state of that disorder. It is likewise called atrophy.

Maf-

Mastication—The action of chewing the food or aliment between the teeth. In mastication, the oily, aqueous, and saline parts of the food are intermixed the one with the other. The smell and taste of different ingredients are lost in one, which, by the solution of the saline parts with the saliva, renders the food flavourable; but such particles as are more volatile and penetrating, being directly absorbed by the bibulous vessels of the tongue and cheeks, enters immediately into the blood-vessels and nerves, so as to cause an immediate recruit of spirits and strength.

Materia medica—Are all those materials afforded by nature and art, which have been found, from practice and experience, useful in curing the diseases of the human and animal body.

Matter—That thick fluid substance which is discharged from a wound, ulcer, or abscess, and is called good or bad according to its appearance or quality.

Maxillary—A term given to sinuses, bones, glands, and nerves, &c. about the cheeks and jaws.

Meatus—A duct or passage, or any canal which conveys a fluid. The passage into the ear is called meatus auditorius.

Mediaſtinum—Is that membrane which lines the cavity of the breast; called likewise the pleura: It goes from the middle of the breast to the spine or back bone; it proceeds from thence, covers the lungs, passes to the sternum, and forms a complete bag on each side. The mediaſtinum contains in its duplicature, the heart, the pericardium, the vena cava, and the œsophagus.

Me-

Medicine—Is the art of preserving present health, or restoring it when lost.

Medulla—Marrow. In anatomy, it has various significations. The white substance of the brain is called medulla or medullary part, to distinguish it from the cortical. The continuation of the brain, &c. in the spine is called medulla spinalis.

Meliceris—The name of certain tumors from the matter they contain, which has the appearance of honey.

Membrane—Is a thin web-like substance, composed of a great number of pliable fibres interwoven together. They differ in thickness according to the number of their planes. These planes are called laminæ or plates. The term membrane is applied differently; the cellular membrane, the mucous membrane, and the common membranes.

Mc-

Meninges—The membranes of the brain, which are two, the dura mater and pia mater.

Mercurial—An epithet given to all the different preparations of mercury or quicksilver.

Mephitis, mephitic—A poisonous exhalation, or what the miners call a damp. The word mephitis is used to signify noxious, hurtful, injurious, &c. It is likewise applied to fixed air.

Mesentery—Is a duplicature of the peritoneum, connected by a cellular membrane, expanding and receiving the intestines as in a sling. That part of it which sustains the greater intestines is called the mesocolon; It prevents the guts from twisting, and keeps them in their proper places.

Me-

Mefocolon—That part of the mesentery which belongs properly to the great intestines.

Metaflafis—Signifies a transposition or change of place of some humour or disease to some other part of the body.

Miasma, miasmata—Implies certain particles floating in the atmosphere, which are inhaled into the lungs both of men and animals, and produces fevers. The miasma, so universally the cause of epidemic fevers, arises from marshes or moist grounds, acted upon by heat. The effluvia or steams arising from diseased bodies may likewise be conveyed in this manner, as they are sometimes retained in an active state for a very long time, according to the state of the air.

Mi-

Miliary—A term applied to fevers where small pustules or vesicles appear on the skin.

Milk—Is a thin ferous liquor, the colour and consistency of which is well known ; but many people may be ignorant of some of its qualities for young animals. It is secreted from the blood by certain glands, and deposited in the udder previous to or at the birth of their young, for their nourishment. This aliment nature hath provided for all new born viviparous animals of the more perfect kind, to support them till they are able to shift for themselves, and till their teeth grow, by which they may be enabled to comminute or break down that more substantial food which nature has provided for their respective species at a more mature age. The first milk that comes after birth is called beesting ; it is of

a scouring and loosening nature, and serves to expel the excrementitious fæces or meconium in the new born animal. Nature or instinct operates so strongly in new born animals, that they almost immediately apply to the teat of the mother for this nourishing liquor.

Millipedes—Wood lice ; so named from their numerous feet.

Minerals—Earths, stones, or metals.

Molares—The name of the large teeth on each side of the jaw.

Morbus—A disease, or such an alteration in the properties of the solids and fluids, or an affection of some part or parts, or the whole of the body, by which the whole system is injured or disturbed, or the action of a part impeded, perverted, or destroyed, attended with peculiar symptoms adapted to

to the nature of the affection and parts affected; or certain appearances deviating from health, from some general or partial affection, by which the system in general or in part is oppressed or disfigured. Diseases are divided into two classes, the acute and the chronic.

Moon eyes or lunatic eyes—In farriery, a disease in the eyes, said to be influenced by the moon.

Mor-founder—A term in farriery, which is applied to a disorder in horses; it is also called foundering in the body and molten grease.

Mooring or moor-ill—A term given to a disorder in cattle when they piss blood.

Mortification—In surgery, a corruption and deadly decay of any part, by which its texture is destroyed from the putrefaction which takes place.

Mo-

Motion, animal—The act of moving; muscular action.

Mucus—Is that colourless, insipid, viscid fluid which is secreted from the mucous glands, throughout the whole internal cavities of the body, from the mouth to the anus. It is likewise the covering for the surfaces of all the membranes in the body that are exposed to any extraneous matter. It is composed of coagulable matter and water. It defends the membranes from being too much stimulated by what is applied to them. Although in a healthy state, it is a mild, bland, insipid, inodorous fluid; yet, when its secretion is suddenly increased by disease, instead of a simple mucus, it becomes a watery fluid, containing the saline parts of the blood; and in consequence of them, it becomes highly stimulating, loses its bland quality of defending the

membranes from acrimony. Its colour is often changed to a whitish or a greenish yellow, acquiring a foetid smell, and puts on, in some respects, the appearance of pus or matter.

Mucilage—Means any viscid glutinous liquor. It is also that humour which is separated from glands about the joints, in order to their easy motion.

Muscles—Are those bundles of fleshy fibres by which the motions of all animal bodies are performed. A muscle hath the power of contracting and lengthening itself, and is the chief instrument of voluntary and involuntary motion. Muscles are of great variety of shapes and forms. There are likewise hollow muscles, as the heart, which, when it contracts itself, presses upon the blood, and forces it out into the arteries. The stomach and bladder are in some measure

ture hollow muscles ; they expel their contents by their contraction. On the other hand, if the fibres of a muscle return upon themselves in the form of a ring, when they contract, they diminish the area or opening within that circumference. Muscles of this denomination, which are employed to shut cavities, are called sphincters, as in the anus, &c. A muscle is divided into three parts, its head, its belly, and tail. The head is the tendinous part which is fixed on the immoveable joint, and is called its origin. The belly is the middle fleshy part, whose fibres are the true muscular fibres, and have the power of motion. The tail is the tendinous part, which is inserted into the part to be moved by it, and is called its insertion.

Mute—Dumbness ; the want of power to articulate words.

Myopia—Shortness of sight.

N.

N.

Narcotics—Likewise called anodynes; that class of soporiferous medicines which induce stupefaction.

Nares—The nostrils.

Nasal—Belonging to the nose.

Nausea—Sickness, qualm, loathing, a propensity to vomit.

Nephritis—A suppression of urine from inflammation in the kidneys, or attended with increased secretion of urine.

Nerves

Nerves—Are those productions of the brain which are the means of sense and motion in every part of the body. They are continuations of the medullary substance of the brain, and appear like white soft cords, without any cavity discernible even by the finest glasses.

Nervous system—Includes the medullary part of the brain and the spinal marrow, with all the cords and filaments which arise from either throughout the whole body.

Neurosis—Nervous diseases.

Neutral—A term applied to such salts as are formed of such proportions of acids and alkalies that neither of them predominate in the compound.

Nitre—Called also sal petre. It is a neutral salt, formed by the coalition of the common

mon vegetable fixed alkaline salt with a peculiar acid.

Non-naturals—A term frequently met with in medical books; but they ought more properly to be called *res neccessariæ*, or things absolutely necessary, as no perfect animal can live without them; they are reckoned fix, viz. air, meat, drink, sleep, waking, motion, and rest, things excreted and things retained. All these things affect animals without entering into their composition or constituting their nature; at the same time, there are very few diseases which happen either to men or quadrupeds, in which an error in one or more of the non-naturals have not an influence as a cause of such disease.

Nosology—Is an explication of diseases, or a discourse concerning the nature and properties of them, dividing them into classes,
es,

es, orders, genera, species, and varieties; by which means accurate distinctions are formed, and much confusion avoided.

Nutrition—The natural effects of food after it has been digested in the stomach, &c. for the nourishment and support of the body.

Nucleus—The kernal of stone fruit, or any thing of the like nature.

Nymphæ—Two prominent folds of the skin about the orifice of the vagina.

O.

Obesitas—Obesity; corpulence or fatness.

Obstetric—Midwifery.

Obstipation—Constipation, costiveness.

Oeconomy—The animal oeconomy is the conduct of nature in preserving animal bodies.

Obstruction—In physiology, is when the fluids cannot pass through the vessels of a particular part or parts, and which may happen from the increased viscosity of the fluid, or a diminution of the capacity of the vessels, or a concurrence of both these causes.

Ob-

Oblongata, or *medulla oblongata*—The medullary part of the brain which passes through a hole in the skull down through the vertebræ of the neck and back.

Oedema—Signifies a serous tumor seated in the cellular membrane, and forms partial anasarca swellings; also serous swellings in the legs.

Oedematous—Is a name given to tumors or swellings which come on suddenly, or when any of the glands are diseased, the lymph cannot pass towards the heart, but goes to the limbs merely from gravitation, and, from the want of due absorption, the limbs swell. This term oedematous is applied to those swellings of the legs that come on very suddenly, attended with inflammation of the skin, very much resembling what is called the erysipelas in the human body.

Oesophagus—The gullet; so called because it carries the food after mastication into the stomach.

Officinals—Is an appellation given to such substances as are directed to be kept in shops for medical purposes.

Oil—Oils are either animal, vegetable, or mineral. Animal oils are the fat of animals. All animal substances yield oil by distillation. Vegetable oils are principally procured by expression, distillation, or boiling. The mineral oils are obtained spontaneously and by distillation.

Olfactory—The name of those nerves which induce smell.

Omasum or *omasus*—The third stomach of ruminating animals; sometimes called abomasum.

Omen-

Omentum—Is that net-like fatty substance which covers the intestines. Its use is, by its fat, to lubricate the parts adjacent, and prevent adhesions of the intestines, and as a preparatory organ for the bile. It is likewise called epiploon.

Opake, opaque—Not transparent.

Opiates—Medicines composed of opium.

Opisthotonos—Is a general spasm over the whole muscles of the body, in which the whole trunk is rigid, stiff, and immoveable. It is likewise called tetanus.

Ophthalmia—Is an inflammation of the membranes which invest the eyes, particularly the tunica adnata.

Optic—The name of those nerves, &c. which go to the eye.

Orbit

Orbit—The orbit of the eye, or circular cavity in which the eye is placed.

Orgasmus—To be in condition for the male, as some female animals are at particular seasons of the year: it is then called venereal. It also means a violent turgescence of the parts.

Orthopnæa—A difficulty of respiration.

Os—The Latin of bone. Bones consist of a mucilage and an earthy matter. Acids dissolve this earthy matter, leaving the bone of its original shape, but soft.

Ossification—Is the beginning of the growth of a bone or bones, or any animal substance changing into a bone. Ossification is likewise a disease that takes place in different parts of the body, most frequent in the arteries, when part of them ossifies or becomes of a bony substance.

Osci-

Oscillation—Certain motions in the fibres of living animals, called osciliatory motions.

Osteogeny—A discourse on the production of bone under its several original states.

Osteography—A description of the several bones which compose the skeleton.

Osteology—A description of the bones.

Ovaria—The part of the body in which impregnation is performed. So called from their resemblance to eggs; by some called the female testicles.

Ozena—A fetid ulcer in the inside of the nose in the human body. In horses it is called the glanders.

P.

Pabulum vitæ—The animal heat and animal spirits are so called as the food of life.

Palate—Is that arch in the mouth which is furrounded before by the teeth and gums.

Palliative—Medicines given only with an intent to relieve pains in a fatal disease.

Palpebræ—The eye-lids.

Palpitation—A preternatural vibration or tumbling of the heart.

Pancreas—The sweet bread, situated under the stomach. It secretes a juice resembling the saliva, called the pancreatic juice,
and

and conveyed by its own proper duct into the duodenum, where it acts as a menstruum for the solution of the food. The pancreatic juice is less viscid than the saliva, and contains a larger portion of the salts of the blood.

Panniculus adiposus—The cellular membrane.

Papillæ—Little eminences on different parts of the body, as the papillæ on the medulla oblongata; the papillæ pyramidales on the surface of the skin. They are longer in some parts, as in the fingers of the human body, where they are called villi. The papillæ of the tongue, &c. They are the organs of touch and taste, being the terminations of the cutaneous nerves.

Paracentesis—The operation of tapping the belly, for discharging water contained in its cavity.

Para-

Paralysis—The palsy. This disorder may be either general or partial. In the latter case, when one side only is affected, it is called hemiplegia. A palsy is an abolition of voluntary motion, or of feeling, or of both. The apoplexy, hemiplegia, and palsy are so nearly connected, that they may be considered as species of one and the same disease.

Paraphrenitis—Delirium; also an inflammation of the diaphragm, attended with delirium.

Paregoric—An epithet for medicines which relieve pain.

Paronychia—The whitloe, or whitlow, being seated near the nail. It is also called a felon. It is an abscess at the end of the fingers.

Parotis—The parotid glands, situated on each side of the head, below the ears. They are

are of the conglomerate kind and secrete saliva, which is poured into the mouth by their own proper ducts, which enter it by the cheeks.

Paroxysm.—Access, or fit of a disease ; called also exacerbation.

Parturition.—Labour, or the bringing forth of a child.

Patella.—The knee pan, or cap of the knee in man. In horses it is called the stifle.

Pathognomonic.—An epithet for a symptom, or a course of symptoms, that are inseparable from a distemper, and are found in that only and no other.

Pathologia or *pathology*.—It is that branch of medicine which explains the nature of diseases, their causes, and symptoms ; for, in order to understand a disease, we should

consider the morbid causes, parts affected, symptoms, crisis, diagnosis, and prognosis, as this branch of medicine is divided into all these particular heads, and which require the utmost attention.

Pectorals—An epithet given to those medicines which are appropriated to disorders of the breast and lungs.

Pediluvium—Bathing the feet in warm water.

Pelvis—The name for the inferior or back part of the belly, where the bladder and rectum are situated.

Pain—A morbid affection arising from external injuries applied to the body. Internally, pain may be excited from the distention of the vessels in a part already become preternaturally sensible.

Penis

Penis—The external part of generation in the male.

Pericardium—That capsule or bag in which the heart is inclosed, and contains a fluid in appearance like serum a little tinged with blood, which keeps the heart moist.

Pericranium—The name given to that membrane which immediately invests the bones of the skull.

Perineum—Is that space between the anus and the parts of generation.

Periostium—That membrane which covers all the bones in the body.

Peripneumony—An inflammation of the lungs. There is another species of it, which is called the spurious or bastard peripneumony.

Pc-

Peristaltic—The motion of the intestines by which they protrude the fœces. It is likewise called vermicular from their worm-like motion.

Peritonæum—That membrane which lines the belly and invests all the viscera contained therein.

Perspiration, called also *transpiration*—It is a thin fluid discharged from the pores of the skin and from the lungs. It is of two kinds; that which is continually transuding through the pores of the skin is called insensible perspiration, the other sensible, as it is visible to the sight, and is called sweat.

Privigilium—Intense watching, a symptom very common in fevers, and always a bad presage.

Pestis—The plague; a putrid fever of the
worst

worst kind ; the most violent, rapid in its progress, and suddenly fatal.

Pharmaceutics—That part of medicine which gives the description of remedies, and teaches the method of rightly exhibiting them.

Pharmacopœia—A dispensatory ; a book containing rules for the composition of medicines.

Pharmacy—Is the art and practice of preparing and compounding medicines.

Phlebotomy—Blood-letting, by opening the vein with a lancet or other instrument.

Phlegm—Cold watery humour, or the watery part obtained from bodies by distillation or otherwise.

Phlogiston—The inflammable principle in bodies.

Phos-

Phosphorus—Chemical preparations which shine in the dark.

Phlegmasia—An inflammation.

Phrenitic—Phrenzy ; delirium.

Phthisis—A consumption.

Phenomenon—Wonderful or uncommon appearance.

Physiology—Is the knowledge of the uses of the different organs of an animal body, how far they are subservient to perfect life and health, by a steady performance of their several functions, and a regular co-operation with those various organs which constitute this complicated machine. Hence, anatomy is a necessary introduction to physiology.

Pia mater—The thin membrane which covers the brain.

Pi-

Pituitary—The name of a gland ; likewise that of the membrane which lines the inside of the nose and all the cavities of the head.

Placenta—Is a congeries of blood-vessels which adhere to the uterus during gestation, and connected with the foetus. Called also the after birth.

Plastic—The faculty of forming anew or generating.

Plethora—Is when the vessels are too much loaded with fluids. A plethora may be either serous or sanguine. In the first there is little crassamentum in the blood ; in the latter too much. In the sanguine plethora there is a danger of fever, inflammation, apoplexy, rupture in the blood-vessels, obstructed secretions, &c. In the serous plethora, the body is disposed to dropsy.

dropfy. A rarefaction of the blood produces all the effects of a real plethora.

Pleura—The membrane which lines the cavity of the breast, covers the lungs, the duplicature of which forms the mediastinum.

Pleurisy—An inflammation of the pleura.

Plexus—Net-work, or a complication of blood-vessels.

Pleuropneumonia—A distemper consisting of a pleuresy and peripneumony.

Plica Polonica—A disorder peculiar to the people in Poland, which is the blood-vessels running from the head into the body of the hairs, which stick together and hang down matted and clotted, discharging an ichorous humour, painful to the patient and disgusting to the spectator.

Pneu-

Pneumonia—Is an inflammation of the lungs, the thorax, or the membrane that lines it.

Polypus—Hath different meanings; but, when applied as the name of a disease, it means those concretions of blood which consist of a whitish, fibrous, and pretty compact substance, sometimes met with in the large blood-vessels after death; but those polypuses that require manual operation seem to be more solid; and to consist of a fleshy excrescence, which frequently grows on the inside of the nose.

Pores—The pores in the skin, through which the perspirable matter passes.

Polyfarcia—Excessive fatness, or corpulence of body; in some cases a species of cachexy, for many disagreeable symptoms attend it, as slowness of motion, oppression,

weakness, difficulty of breathing, sweating on the least exercise.

Presage—Foretelling, or prognosticating the issue of a disease.

Presbytæ—A weakness of vision from old age.

Primæ viæ—The first passages; that is, the stomach and intestines.

Processus, a *process*—In anatomy, is a protuberance or eminence rising out of the larger bones for the insertion of muscles. They are also called condyle.

Procidencia—A prolapsus, or the falling down of any part, as the fundament; a disorder frequent in the human body, from its erect posture, but seldom occurring in our subject, from its horizontal position.

Pro-

Profluvia—A flux, or increase of some natural discharge, attended more or less with fever.

Prognosis—Prognostic of a distemper, is the knowledge of the signs by which we presage or foretell the circumstances that will happen in the course of the disease.

Prophylactic—The method of preserving health and averting diseases.

Progressive motion—The act of going forward ; advancing by degrees.

Pulmonary—Any thing relating to the lungs.

Pupil—That opening in the eye which transmits the light to the humours of the eye.

Pulse—That pulsation (or beating, as it is commonly called) in the arteries of living animals

animals at every contraction of the heart in propelling the blood through the arterial system. From this pulsation, combined with the different degrees of velocity, &c. of the pulse, the practitioner is enabled to form an estimate of the case of his patient.

Pulvis—Such forms of medicine as may be reduced to powder.

Puncta lachrymalia—Lachrymal points or holes in the inner edge of the eye. They convey the tears, after moistening the surface of the eye, and carry them into the lachrymal sac, and then into the nose.

Purgantia—Purgative medicines are those that increase the natural discharge of the fæces. They are of different degrees of strength, viz. the lenient or mild, or laxative. The stronger kinds, which operate
with

with more violence, are called draftic. Purging medicines are likewise called cathartics.

Pus—The matter which appears on the surface of a wound; also that matter which is found on opening well digested abscesses.

Puncture—A small hole, either natural or artificial.

Pustula—Pimples on the surface of the skin containing pus or matter.

Putrefaction—In the humours of an animal body, may be either partial or general. It is a species of fermentation in which the heat and fixed air in the subject are separated, by which a dissolution of the parts are effected, attended with a foetor or ill smell. When a small portion of matter becomes putrid,

putrid, it easily diffuses itself through a large quantity, like leaven in a paste. Hence, putrid matter being absorbed into the body soon contaminates the whole system.

Pyloris—A name given to the right orifice of the stomach.

Pyrexia—Febrile or feverish diseases.

Q.

Qualitas, quality—The natural and inseparable properties of bodies are called their qualities. The relative goodness or genuineness of medicines.

Quassia—A strong bitter wood.

Quitter—A swelling on the coronet of a horse's foot, which breaks out and discharges a thin matter, and, if not speedily cured, it degenerates into a fistulous ulcer.

Quotidian—Intermittent fever, which intermits, but returns every day.

R.

R.

Radix—A root, or part of a plant by which it naturally receives its nourishment. Some roots are fleshy, others fibrous, and others woody.

Receptaculum chyli—The receptacle of the chyle. It is a membranous vesicle, of various shapes, but generally longish. It lies on the right side of the aorta, near the vertebræ of the back.

Rectum—The last of the intestines, ending at the anus.

Reabsorb—Means any fluids, or even matter, that is sucked up by the absorbent vessels, and carried into the circulating system.

Re

Ramification—Branching or spreading out, like the branches of a tree.

Regimen—Is the regulation of the diet, with a view to preserve or restore health.

Remitting—Diseases which abate in their violence and returns again.

Renes—The kidneys, which secrete the urine from the blood.

Repellents—Medicines which prevent such an afflux of a fluid to any part as would rise into a tumor, as they cool, dry, astringe, and strengthen the parts, and enable them to resist the afflux of fluids lodged there.

Repulsion—That cause in nature which opposes itself to attraction, and repels bodies after they have approached each other to a

certain point, and prevents their uniting together.

Resins—Exudations from vegetables, as evergreens, tar, turpentine, &c.

Resolution—In a medical sense, is when an inflammation, by some effort of nature, or by means of art, goes off of itself, by some evacuation happening at the time, or by a fever taking place, or transferring the morbid matter to some other part of the body, or it may terminate in some other disease.

Respiration—Is the action of taking in and discharging the air from the lungs.

Restoratives—An appellation given to those medicines that are said to be more adhesive and subtile, whereby they enter into the nourishment of the remotest parts.

Recte

Rete—A congeries of vessels, or any animal substance resembling a net.

Retention—The keeping back, or undue retention of any natural discharge.

Reticulum—The second stomach of ruminating animals.

Retina—The net-like expansion of the optic nerve on the inner surface of the eye.

Revulsion—The retraction or drawing away any humour in a different way.

Rheum—A fluxion ; a catarrh.

Rheumatism—Is a painful disease affecting the intermediate spaces between the joints and muscles in different parts of the body. Sometimes the viscera are affected by it. Horses are more subject to this complaint than is generally suspected.

Rhu-

Rhubarb—A plant of the dock kind, whose root is of a purging quality.

Rigor—A general chilliness, with a sense of coldness inwardly.

Rigid, rigidity—Stiff, inflexible; a term frequently applied to fibres in that state.

Ring bone—In farriery, a callous substance that grows immediately above the coronet of the horse's foot, surrounding it like a ring.

Rotula—The knee-pan in the human body; also called the patella. It is called the stifle bone in horses.

Ructation—A discharge of wind by the mouth.

Running thrush—Is a discharge of foetid ichorous

ichorous matter from the cleft in the frog of a horse's foot.

Rupture—A swelling on the belly, where the abdominal contents are protruded thro' the teguments without breaking the skin.

S.

S.

Saccharum—Sugar ; the essential salt of the sugar-cane, or any vegetable substance from which it may be obtained. There are other substances which bear that name, as the *saccharum saturni*, &c.

Sac—A membranous bag ; the name of the blind gut ; so called because it is open only at one end, like a sack.

Sal—Salt ; it is a body more or less hard, having a remarkable savoury taste. There are a great many salts used in medicine. *Sal* is a term affixed to all saline substances.

Saliva—Is that fluid by which the mouth and tongue are continually moistened, in their natural healthy state. It likewise promotes the digestion of the food in the stomach. This saliva is supplied by glands which secrete it from the blood, and are called salivary glands.

Sali-

Salivation—Is that extraordinary discharge of saliva by the mouth which is excited by the use of mercury.

Sallenders—A disease in horses affecting the bending of the hock joint, on the fore part, and is a kind of scurf forming chinks or cracks in the skin, discharging a sharp indigested matter, which sometimes turn into dry scabs.

Sanguis—Blood ; that red fluid which is contained in the arteries and veins.

Sanative—Medicines which heal diseases.

Sanies—Matter ; corruption.

Sapo—Soap ; a composition of oils or fats with alkaline salts, of which there are varieties.

Saponaceous—Soapy, or like to soap.

Sarcocoele—Is a firm fleshy kind of enlargement of the testicle, or scirrhous testicle.

Sarcoma

Sarcoma—A fleshy tumor in any part of the body.

Saturate—To impregnate or be filled with, as when a porous body imbibes as much of any liquid as it can take up; or a solution of salts in any liquid, that cannot suspend or dissolve more.

Scabies—The scab or itch.

Scapula—The shoulder bone or shoulder blade.

Scarification—This word implies incisions made with a knife or other instrument.

Sceletos—A skeleton; all the bones of an animal freed from the teguments, vessels, muscles, &c. and properly connected together, have the general name of skeleton.

Scarf-skin—The epidermis.

Scammony—A gummy resin of a brisk purging quality.

Sciatic

Sciatic—A species of the rheumatism when seated in the hip joint.

Sclerotic—The outermost coat of the eye.

Schirrhus—Is a hard tumor with little or no sensation in it. The seat of this kind of tumor is generally in some glandular part.

Scorbutic—The scurvy; is a chronic disease of the putrid kind.

Scratches—A disease affecting the legs and heels of horses, in dry scurf or scabs.

Scrophula or *scrofula*—The king's evil. Every part of the body may be affected with this disease, but its immediate seat seems to be in the lymphatic vessels. The farcy ulcers in horses has a great resemblance to the scrophulous ulcers in the human body.

Scrotum—The external covering of the testicles.

Sebaceus—Liquid suet, or sebaceous humour,

mour, is supplied by the sebaceous glands, in order to preserve the sensibility of the skin, and to keep it moist, by preventing too copious a discharge of perspiration. When this glutinous humour is wanting, as in some diseases, the skin becomes dry and parched. All the inner membranes of the body are supplied with an humour similar to this, in order to prevent their cohesion. In the human body, these sebaceous glands are very distinctly seen about the nose, where their contents appear hardened, and at the extremities of their ducts they appear like black spots; and, when they are squeezed out, they appear like a worm with a black head.

Secretion—Implies all those various kinds of humours that are secreted from the blood throughout the whole body, of every denomination.

Sedatives—Are those medicines which
are

are suited to diminish the motions and power of motion in the body. They are the opposites to whatever is irritating.

Semen—Seed of animals; a term applied to the prolific fluids of animals.

Senna—The leaves of a plant used as a purging ingredient.

Sensibility—The quality of being sensible, or the perceiving of any visible thing affecting or causing some alteration in the organs of sense, or tending towards a morbid state, it may be too much increased, and the cause of irritability.

Serum—The thin part of the blood. This serum contains a coagulable matter, which forms what is called the buff on the blood when it turns cold, after taking it from a blood-vessel.

Sc-

Sesamoid.—The sesamoid bones. These are the little bones found at the articulations of some joints.

Seton.—An issue made in any part of the body, by passing a large needle armed with a cord through the skin, in order to promote a discharge of matter, or passed thro' any tumor, to discharge gradually its contents.

Signs.—Are those appearances which manifest the loss of health, or the presence of disease, and relate to the general causes of disease. Signs of a disease are to be taken from general appearances, as looks, motions, gestures, breathing, pulse, heat, dryness, moisture of the skin, &c.

Sinus.—A deep hollow ulcer, with a small opening or orifice for its discharge. A
sinus

sinus in a bone is a cavity which receives the head of another bone.

Sitis—Thirst ; that disagreeable sensation excited by a defect of moisture in the mouth and throat ; generally an attendant on fevers.

Solids—A solid. In the animal body, the elementary parts of fibres. This term is applied to the fibres in general, as all the solid parts are composed of them ; even the hard bones are composed of fibres.

Solution—Matter dissolved. The dissolving fluid is called a *menstruum* or solvent : thus. water dissolves salts. Solution of continuity is the definition of a wound.

Sleep—During sleep the nourishment received from food is applied to the decayed or wasted parts, the blood is recruited, and the secretions perfected.

Spasm

Spasm—This term is variously used ; but its most general meaning signifies a preternatural contraction of any particular part of the body which are attended with considerable mobility of the system. Spasmodic diseases are distinguished or arranged according as they affect the several functions of the body, whether the animal, vital, or natural.

Spavin—In horses, of which there are two kinds, the bone spavin and the blood spavin ; termed so in farriery. The former is a bony excrescence which grows upon the inside of the bone of the hock joint ; the latter is an enlargement of the vein on the inside of the hock joint, and ought more properly to be termed a varix.

Specifics—Those medicines which are said

to

to be more infallible than any other in curing particular diseases.

Spina—The spine or back bones, which may include the vertebræ of the neck, the back, and the loins.

Spiritus—Spirit; any fine volatile substance which exhales from bodies in a given degree of heat is called spirit. The nervous fluid, by analogy, has been termed spirit, and called animal spirit.

Sphincter—The name of those muscles which shut up the orifice of any hollow part, as in the anus.

Spinalis—Spine of the back; also the name of different processes, muscles, arteries, &c. That part of the brain which goes down through the vertebræ of the neck, back, and loins, is called medulla spinalis.

Splent

168. TERMS DEFINED.

Splent—In farriery, is a bony excrescence which grows on the leg or shank bones of horses.

Steatoma—A species of tumor or wen, whose contents appear like suet.

Sternum—The breast bone.

Sterility—Barrenness.

Stertor—Snorting, or violent expiration through the throat and nose, frequently attending diseases, as apoplexy, &c.

Stimulus—Whatever excites to action is called stimulus; thus, every organ whose function depends upon motion has its natural stimuli, or occasional causes, exciting them to action. Whilst these stimuli continue in their natural state, the functions, so far as depends upon them, will be properly performed; but, when their action is
either

either irregular, that is, too great or too weak, diseases must follow : thus, the blood stimulates the heart and arteries to excite their powers in the circulating system ; food excites the action of the stomach and intestines ; urine stimulates the action of the bladder in discharging its contents. The term stimulants are also applied to certain medicines which increase the oscillatory motion of a fibre, or excite the action of the moving fibres in the living animal.

Stomach—That viscus which receives the food for digestion immediately after mastication.

Strangury—Is a discharge of urine in small quantities at a time, attended with great pain.

Strain—A term applied to any membranous or tendinous parts that have been overstretched beyond their proper limits.

Strangles—The name of a disease to which young horses are most liable, and which is a swelling and inflammation about the throat and jaws, resembling the quinsy in the human body.

Stringhalt—In farriery, is an involuntary jerking motion in one or both of the hind legs of horses on moving.

Strumous—A glandular swelling of the scrophulous kind.

Stylo, styloid—The names of certain muscles, processes, &c.

Styptic—A term applied to those medicines which are said to stop hæmorrhages or bleedings.

Subclavian—The name of certain arteries, muscles, &c. situated under the clavicle or channel bone.

Sub-

Sublingual—Implies, under the tongue, the name of arteries, veins, glands, &c. in that situation.

Subsultus—Twitching or starting of the tendons; also an involuntary starting, or spasmodic contraction of the muscular parts.

Sudor—Sweat; is only a more violent degree of perspiration which transudes thro' the pores of the skin on great exercise, in a healthy state of the body. It is likewise produced by disease, and by violent or very acute pain. Sweat consists of a water, a highly exalted oil, a salt, and earthy matter.

Sudorific—A name given to those medicines which excite sweat.

Surbating—A term in farriery applied to those horses that go tender on their fore feet; they are then said to be beaten or battered in the feet.

Sur-

Surfeit—Overloading the stomach with food.

Sympathy—Every part of an animal body hath a sympathy or feeling with the whole ; so that if any part is any how deranged in its natural functions, other functions or other parts become affected likewise.

Suppuration—The forming of pus or matter in a wound or tumor.

Symphysis, a growing together—In anatomy, a particular kind of articulation of the joints.

Symptoms—Are the signs or appearances present in a disease ; yet a symptom may be a disorder at the same time ; as, when a symptomatic fever is produced by a phlegmon or boil, a knowledge of the origin and cause of symptoms conduces to confirm the prognosis, and to the certain removal of the disease.

Syn-

Synchysis—A disease in the eye, consisting of a confusion of the humours from a violent blow, producing inflammation, &c.

Synocha—An ardent or inflammatory fever, attended with great irritation.

Synochus—A continual fever, whether of the ardent or putrid kind.

Synovia—Is a lubricating fluid, secreted from certain glands in the joints to preserve their motions easy and free. When there is a deficiency of this fluid, from severe long continued exercise, a crackling noise is observed in the joints on moving.

Syncope—Fainting.

Systole—The contraction of the heart at the instant it throws out the blood into the arteries.

System—Method, arrangement in a regular form.

T.

Tabes—A wasting of the body, with great debility ; to consume, waste, or pine away gradually.

Tænia—Flat, or what are called tape-worms, which infest the intestines of the human species. They are the most troublesome, and the most dangerous of any. They are not known to infest the bowels of animals, at least of horses.

Tartar—Is an essential acid concrete salt of grapes thrown off from wines to the sides and bottoms of casks, which, after certain preparations, prove purgative.

Tem-

Temperament—Something peculiar to the constitution or habit of body of every individual, as the sanguine, when the habit is full of good blood, the phlegmatic, when the habit is full of serum or phlegm, the temperate, when the red blood and serum are in due proportions, and the depraved or bad habit, which is called cachochymic.

Temporal—A name applied to certain bones, arteries, muscles, &c. about the temples.

Tendon—Is a continuation of muscular fibres, it being divided into as many fibres, or rather bundles of fibres, as the muscle itself to which the tendon belongs ; but the tendinous fibres are more compacted, smaller, drier, and harder than the fleshy fibres. Tendons are not capable of contraction, but serve like ropes to pull when the fleshy fibres of the muscle acts, and for the com-
modiousness

modiouness and firmness of insertion, and for the direction of motion.

Tenesmus—A continual painful urging to stool, when little or nothing can be discharged, with considerable pain at the anus on every attempt.

Teres—The round worm, which infests the intestines both of men and quadrupeds.

Terra—Earth, of which various kinds are used as medicinal.

Tertian—A species of fever of the intermittent kind; every first and third day it is present, the second day is free.

Testes—The testicles.

Tela cellulosa—The cellular membrane.

Tetanus—Is a spasmodic disorder, in which
the

shrivelled in adults. It is also called the sweat bread.

Tonic—Medicines which strengthen the fibres. Every vessel, membrane, and muscle, with every the smallest fibre in sensible parts, have a natural tendency to shorten or contract themselves. This is called their tonic power. Medicines which are given with the view of restoring this power when deficient are called tonics.

Tonsils—The name of certain glands at the root of the tongue.

Topics—External applications to any particular part.

Torpor—A state of inaction, sluggishness, or an aversion to move about. It is likewise applied in cases of numbness, or deficient feeling.

Trans-

Transfusion—The transmission of blood from the vessels of one animal to those of another, by means of a canula or pipe.

Transpiration—To breath through ; perspiration.

Transudation—To sweat through, or perspire through the pores.

Trismus—The locked jaw.

Tremor—A trembling, without a sensation of cold.

Trocar—The name of an instrument used in discharging the water from the belly in an ascites or dropfy.

Tubæ—Tubes or passages in any part of the body, as the Eustachian tube in the ear, the Falopian tube, &c.

Tumor—Is a disease in which the parts
rise

rife above the neighbouring parts, by swelling, or an undue increafe of its bulk, containing matter. Tumors have different names, according to their fituation, figure, contents, &c. Thus, when pus or matter is the contents of a tumor, it is called an abscefs; if an abscefs is formed in the lungs, it is called vomica; when matter is contained in a bag, it is then called an encyfted tumor.

Tunica—A fkin, a coat, or a membrane, which covers any part.

Tubercles—Are little hard tumors which grow upon the furface of any part of the body, or in the internal parts, as the lungs.

*Turpentine*s—The produce of the different fpecies of pine trees, of which there are different kinds, as the Chio, Venice, and Strafburg.

Tuffis

Tuſſis—Cough, which is a violent expulſion of air from the lungs by means of a convulſive force in them, accompanied with a violent expiration.

Tympany—A ſpecies of the dropſy.

Typhus—A fever of the nervous kind.

U.

U.

Ulcer—Is a solution of continuity in a soft part, made by erosion of the fleshy substance. Wounds degenerate into ulcers in bad habits from a fault in the humours; hence there is a farther loss of substance. A loss of substance in the bones from erosion is called a caries, and, when an abscess is opened for the discharge of its contents, it gets the name of ulcer. Ulcers receive different names, from the causes, figure, and the parts they affect.

Unguent—The name given to ointments.

Ungues—The nails on the fingers and toes in the human body, and the hoofs and claws

claws in animals. They are continuations of the epidermis or scarf-skin. Their substance is like that of horn. They are composed of several planes of longitudinal fibres strongly compacted together. These strata end at the extremity of each finger, claw, or hoof. They are all nearly of an equal thickness, but of different lengths. The principal use of the nails and claws are to strengthen the fingers in the human body and the feet in animals, and to catch their prey. Hoofs are the base and support of the whole body in horses. The term ungula is applied to horny substances.

Unorganized—Not organized or not formed.

Urachus—Is the passage for the urine from the foetus to the allantois.

Urethra—The passage of the urine from
the

the bladder till it is conveyed out of the body, in male and female.

Urine—That fluid which is secreted from the blood in the kidneys, conveyed by the ureters to the bladder, and thence discharged out of the body.

Ureters—Tubes or canals which convey the urine from the kidneys to the bladder.

Uterus—The womb; called also the matrix. It is situated in the pelvis, between the rectum and bladder.

Uvea—A name given to the posterior lamina of the iris; by some the choroides is called the uvea.

Uvula—That fleshy substance which covers the wind-pipe, acting as a valve. By means of its different actions we can breathe either through the mouth or nose. It is of an irregular shape.

V.

Vaccine—Belonging to a cow, or taken from a cow.

Vagina—The passage from the external pudenda to the mouth of the uterus.

Valve—Is a membranous substance on the inside of certain vessels, as in the veins, &c. which open to admit the blood or other fluids to pass, and which shut immediately to prevent their returning.

Valvulæ conniventes—They are loose circular folds on the inside of the intestines. Their use is to mix the chyle with the bile

and pancreatic juice, and to retain the chyle that it may not escape the lacteals.

Valetudinarian, or *valetudinary*—One that is weakly ; infirm.

Vapor—The fine parts of warm fluids that fly off in a steam or thin smoke in an aëriform state.

Variola, *variolus*—Infectious matter, as the smallpox in the human subject, or the variolus matter from farcy ulcers in horses.

Varix or *varices*—A preternatural and irregular dilatation of parts of the veins.

Vascular—Full of vessels ; consisting of vessels ; or any thing belonging to the vascular system.

Vegetables—Are those productions of nature which have life and growth, but no sense, as herbs, trees, &c.

Ve-

Veterinarian—One who professes the art of curing the diseases of horses and other cattle. The term veterinary is used for the sake of brevity.

Vena, a vein—Thin tubes or canals which arise in the extremities of the body and terminate in the heart. The blood is distributed all over the body by the arteries, and is returned to the heart by the veins.

Venenum—Venom or poison.

Venter—The belly or abdomen.

Ventricle—The stomach ; also the ventricles or cavities in the heart and brain.

Vermes—Worms which infest the intestines both of men and animals, as the teres or round-worm, the tape-worm, the ascarides, and bott-worm. The latter is peculiar to horses.

Verruca—Warts ; excrescences on the
surface

surface of the body. They are either wet or dry.

Vertigo—A giddiness in the head, when objects seem to the patient to turn round.

Vesica urinaria—The bladder which contains the urine.

Vesicula, fellis—The gall-bladder; likewise called *folliculus fellis*. In the human body, it is situated under the great lobe of the liver, a little towards the right side, but horses and several other quadrupeds have no gall-bladder.

Vertebræ—The bones of the neck, back, and loins.

Vessel—Any thing that contains fluids in the body.

Villous—Shaggy soft woolly hair-like substances.

stances. This term is applied to the internal coats of the stomach, intestines, &c.

Viscera—The bowels, or contents of cavities within the body, as the brain within the skull; the heart and lungs in the thorax or breast; the stomach and intestines in the abdomen or belly; the bladder, and parts of generation, in the pelvis. When any of these are mentioned singly, they are called viscus.

Viscid—Tenaceous, glutinous.

Viscosity—Ropiness, claminess, glutinousness.

Vis conservatrix—The preserving power, or the exertion of the plastic power, as far as maintains organization.

Vis genetrix—The generative power, or the generative exertion of the plastic power.

Vis

Vis medicatrix—The healing power, or the plastic powers employed in extinguishing disease and restoring health. This is often expressed by the words nature, and natural causes.

Vis vitæ, called also *vis medicatrix naturæ*—The state or condition of animal organization, indispenfibly requisite to the capability of function.

Vital heat—Necessary or essential to life.

Vitriol—Preparations made from pyrite stones, in which there are copper, and from which a great variety of preparations are made both for medical and furgical uses.

Vitreous—Glassy ; applied to the pellucid humour of the eye.

Viviparous—Animals which bring forth their young alive.

Volatile—This term is applied to substances of so light a nature, that their particles are perpetually escaping into an aëriform state.

Vomer, called also *septum nasi*—The partition in the nose.

Vomica—A tubercle or abscess in the lungs.

Vulneraries—A name given to a certain class of medicines of the balsamic kind.

Vulnus—A wound, or a recent bloody solution of continuity in the fleshy parts, made by a hard or a sharp instrument.

W.

Warble—A small hard knot or tumor situated below the skin of horses.

Warts—See verrucæ.

Water—See aqua.

Wen—A fleshy or callous excrescence.

Windgal—Little soft swellings on the joints and legs of horses.

Withers—The top of a horse's shoulder, immediately before the seat of the saddle.

Womb—That viscus which contains the foetus.

Worms—See vermes.

Wound—See vulnus.

Y.

Y.

Yaws—A disease endemical to Guinea and the hot climates in Africa.

Yest, yeast, or barm—The scum that arises on fermented liquors, as wort made from malt. Recommended in putrid fevers by the Reverend Mr Cartwright.

Yellows—In horses, the jaundice.

Z.

Zedoary—A spicy plant, the root of which is used in medicine. It comes from the East Indies.

Zigomatic—The name of a process of a bone and of a muscle, forming an angle like a yoke.

Zingiber, ginger—A root of a fibrous texture. It is warm and aromatic, of great use in cold flatulent disorders, and where there is a laxity or debility of the intestines. Its effects are more durable than those of the pepper kind.

Zoology—A treatise on animals.

Zoonomia—A discourse reasoning on the principles of animal life.

Zootomy—The dissection of animals.

TERMS

TERMS IN FARRIERY—*Omitted.*

A.

Ambury, anbury, or angle berry—Red, moist, fleshy excrescences, of various sizes, something like a potatoe, tinged with the appearance of blood, which grow on different parts of the body in horses, either with a broad or narrow base.

Anticor—A deep seated swelling in the muscles of the breast, extending upwards to the throat, and threatening suffocation.

B.

B.

Balls—Medicines made up in a solid form for horses, and given in the shape of a ball.

Bars—Are those ridges on the palate or roof of a horse's mouth, extending across it, betwixt the tusks and grinders.

C.

Charge—An external application, composed of different ingredients, forming a compound between an ointment and a plaster, or between a plaster and a poultice. They are applied either hot or cold, according to the intention of the cure.

Coffin bone—The bone at the extremity of each foot, inclosed within the hoofs of horses.

Coffin

Coffin joint—The articulation or joining of the pastern bone with the coffin bone.

Crib-biter—A vice or bad habit in some horses, who, catching hold of their manger, post, or gate, with their teeth, suck in the air, and swallow it in gulps.

Cutting or interfering—Is when one foot strikes the opposite leg in moving, so as to fret off the hair or cut the skin.

D.

Drench—Is the giving medicines to horses in a liquid form.

F.

False quarter—A defect in the quarters of the hoofs of horses.

Foundring—In the way it is applied to horses, is a very dark and abstruse term,
being

being used by French authors, it has been adopted by the English. The word *fondre*, in French, signifies to melt or liquify; hence the ancient farriers applied it to that disease they call molten grease; likewise to a disorder in the feet called founder.

Frog, or *frush*—That soft spongy like horny substance, shaped like a dart, connected with the sole and binders in the under part of the hoofs of horses, forming their heel.

G.

Gourdiness—A thickness or swelling in the legs of horses.

Grease—A disease in the legs and heels of horses, attended with swelling and inflammation of the parts, followed by a discharge from the pores of a clammy, greasy, soapy like matter, of a very foetid ichorous quality.

H.

H.

Haws—A preternatural enlargement of the cartilagenous substance in the inner canthus of the eye of horses.

Hide-bound—A term in farriery, when the skin of a horse is hard and dry, and adheres too close to the back and ribs, &c.

Hoof-bound—A horse is said to be hoof-bound, when, from disease or bad management, in keeping them too dry, or in shoeing, the hoofs contract and grow less than they originally were.

J.

Jardon—Is a hard callous substance which grows on the outside of a horse's hock.

K.

Kibes—Are chinks or cracks on the inside of the hind pasterns or heels of horses.

L.

L.

Lampas or *lampars*—A swelling of the palate, which rises above the fore-teeth, mostly in young horses, and prevents their eating.

M.

Mallenders—Is a disorder in horses on the inside of the fore leg at the bending of the knee, and is a discharge of a sharp indigested matter, similar to that disorder called the fallenders on the bending of the hock joint.

Mange—See scabies.

Molten grease—A disorder in horses, in which, it is said, the fat is melted, occasioning a violent diarrhœa, attended with a discharge of an oily substance with the dung.

N.

N.

Near-side—The sides of a horse are distinguished by the term near, far or off-side. The near-side is the left side, to which we always approach when we go to mount or to handle a horse.

Nicking—An operation performed on the tails of horses, which is, dividing the flexor muscles on the under side of the tail cross-ways, and elevating the tail by means of a pulley for some time afterwards.

O.

Osslets—Bony excrescences which grow on the bones of the knee joint.

P.

Panicle—A muscular expansion peculiar to horses and other large quadrupeds, called

the fleshy panicle, situated immediately under the cutis or true skin, particularly in the shoulders, ribs, and flanks, where, at the pleasure of the animal, it draws the skin into wrinkles, and, by a quivering motion, shakes off dust or flies that hangs loose on the hair.

Paster of a horse—Is the space between the fetlock and the coronet, consisting of two bones, called the great and little pasterns.

Poll-evil—In horses, is a deep seated tumor on the nape of the neck or poll, just behind the ears, which soon becomes an abscess.

Pursiveness—In horses, a difficulty of breathing, or asthmatic.

Q.

Quittor—A tumor on the coronet of a horse's foot, which soon terminates in a fistulous ulcer.

R.

Rats-tails—Is a dry warty excrescence on the legs of horses, resembling the tail of a rat, in a perpendicular direction above the fetlock joint.

Retraits—A term for the prick of a nail in shoeing horses.

Ridgel, ridgling, or riggling—A horse that has been but half-cut or half-castrated.

Rowels—A term in farriery for an issue or artificial vent in horses.

S.

S.

Sand-crack—A term for a small cleft or crack in the hoofs of horses.

Stavers, or staggers—A general name, very improperly applied by farriers to all diseases in horses when they reel, stagger, or appear giddy, on being moved, and which they have divided into three species, viz. the staggers, as above; the mad staggers, which properly is frenzy or delirium; the sleepy staggers, which is a lethargy.

V.

Vives—See Strangles.

W.

W.

Wolves teeth—A horse is said to have wolves teeth when the teeth grow outwards or inwards, so as to lacerate and wound the cheeks, gums, or tongue, on eating, or when the upper teeth overpass the under, so as to prevent his chewing his food.

VETERINARY

VETERINARY PHYSIOLOGY

AND

P A T H O L O G Y.

INTRODUCTION.

CHAP. I.

IN the foregoing definitions we have explained what is meant by Physiology, viz. That branch of medical science which teaches us the knowledge of the animal œconomy in general ; the uses of the different

rent organs of the body ; how far they are subservient to one another, and how far each contributes to perfect life and health, by a steady performance of their several functions, and a regular co-operation with those various organs which constitute the animal body : for, till such time as this branch of medical knowledge is in some degree understood, we cannot comprehend that other branch which immediately follows it, viz. Pathology, which is that part of medicine which explains the nature of diseases, their causes and symptoms ; for, in order to understand a disease, we should consider the morbid causes, parts affected, symptoms, crisis, diagnosis, and prognosis. Physiologists have adopted different modes or methods in beginning to explain the animal œconomy : Some begin by describing the external teguments ; others with the circulation of the blood ; others again begin by describing the
minute

minute constituent parts of the body :—We shall adopt this latter method, as it may be attended with more benefit to those who have not had the opportunity of attending a regular course of anatomy : Observing at the same time, that the human, and every other animal body, may be compared to a circle ; the actions or functions of its different parts being, throughout the whole body, in a state of mutual dependency upon each other ; inasmuch that, at whatsoever part we begin to explain its operations, we are obliged to assume, or take for granted as known, the action of some other organ, which influences that we first treat of. Thus, if we begin with describing the circulation of the blood, as the heart is a muscle, we must suppose muscular motion in some degree understood. If muscular motion was to be first explained and accounted for, as that cannot be produced without some operation

ration

ration of the nerves and arterial blood, we should be under a necessity of supposing the influence of the nerves as known, and at least a part of the circulation. Again, if we commence by explaining the nature of the aliments before they are ingested ; prosecute the successive different changes they undergo, from the mouth, to their being mixed with, and converted into blood ; then describe the circulation, and so on ; in the course of that method muscular motion frequently occurs, before it can be treated of in its due order ; many glands offer themselves before secretion can be explained, &c. In short, whatever method is used, the like inconvenience occurs. In order to avoid this intricacy, and that the beginner may be as little embarrassed as possible, we shall begin, as was proposed, by describing the constituent parts of the body, and gradually

proceed to the larger and more compounded.

Fibre—In anatomy and physiology, denotes a small thread or filament, without a cavity, at least without a visible cavity; whose breadth and thickness bears a very small proportion to its length. The least fibre of all is too minute to be perceived by our senses, however assisted. These fibres are no other than bundles of many smaller ones tied together. Their more permanent parts are demonstrated to be composed of earth whose particles possess connection and a power of cohesion, not from themselves, or from mere contact, but from the intermediate glue or gluten placed betwixt them. It has likewise been demonstrated, from the chemical analysis of animal substances, that this glue or gluten is composed of oil combined with water, by the vital attrition in
the

the body of animals. These fibres, composed, as we have seen, of earthy particles, adhering longitudinally, and connected by an intervening cohesive glue, compose one of the least or most simple fibres, such as may be understood rather from reason than from our senses, even when assisted by the most accurate microscopes, by which the smallest fibre, when divided to still smaller, appear in every respect similar to the larger, till at last they seem mere lines.

The fibres which appear to the unassisted sight may be said to be of two kinds: the first is lineal, and have their length considerably large in proportion to their breadth; the second are those in which their breadth is greater than their length. These, when loosely interwoven with each other, form what is called the cellular tunic, or cellular membrane.

This

This cellular substance is made up of an infinite number of fibres, forming little plates or scales, which, by their various directions, form small cells or web-like spaces, and join together all the parts of an animal body in such a manner as not only to sustain, but to allow them a free motion at the same time. But in this web-like substance there is the greatest diversity relatively to the proportion betwixt the solid parts and open cells, as well as the breadth and strength of the little plates, and the nature of the liquor they contain, which is sometimes more watery and sometimes more oily; and likewise to the mixture of fibres or solid parts in one place more than others. But of this important membrane in the animal œconomy we shall have occasion to say more hereafter.

Membranes—Out of the above net-like cellular substance, compacted by the little plates concreted and pressed together, arise broad
and

and flat plates, lamina, or skins, in various parts of the body ; which, being generally disposed in a rectilineal direction, form what are called membranes, whose thickness bears a very small proportion to their breadth and length. Most, if not all the membranes we see in the animal body, are composed of, and resolvable into thinner ones.

Vessels—Membranes being convoluted into cones and cylinders, pervaded by a flux of some juices or liquors through their cavities, put on the name of vessels, which, in a general sense, signifies whatever has a cavity to contain and hold any thing, is here commonly restricted to signify the animal tubes or canals through which fluids or juices move. The least imaginable vessel is made of the least membrane, rolled up in the form of an hollow cylinder, or part of a cone. The larger vessels, as their coats or walls must

must be thicker, are composed of thicker membranes, upon which smaller vessels run.

Artery—Is the name of that kind of vessel, which, arising originally from the heart, contains a fluid, whose motion is directed from the heart towards the extremities and surface of the body. The larger, and easily visible arteries, contain red blood; are of a conical figure, slowly tapering from the heart towards the surface and extremities of the body. In living animals they beat, or have what is called a pulse, answering to the motion of the heart. Their coats or walls look whitish, and are pretty thick and strong.

Veins—On the other hand, contain a fluid, whose motion is from the extremities or surface of the body towards the heart. Their coats are thinner and more transparent than those

those of the arteries, and therefore they appear of a bluish livid colour, the blood shining through them. In many places they have valves within them, which open towards the heart, and shut the contrary way.

Gland—Denotes in general an organical texture, of a circumscribed figure, framed so as to separate from the blood a liquid different from and unlike the blood. Of these there are various kinds, some more simple, others more complex or compounded, as shall be shewn in the sequel.

A duct, or excretory duct—Is a canal containing a fluid different from red blood; and is almost always the outlet of a gland or glands, or some glandular contrivance.

Nerve—Is the appellation of these soft white cords, which proceed either from the
brain

brain and its appendages, within the cranium or skull, or from the spinal marrow, and are the immediate instruments of sensation, and indispensably requisite towards producing muscular motion. They are without any cavity discernible even by the finest microscope.

Muscle—Is the name of the immediate organical instrument of motion in the animal body, whether voluntary or involuntary. They may be said to be organical, because mere elasticity is the immediate cause of some motions, as in expiration, and the restitution of the arteries. The general characteristic of a muscle is, to consist of fleshy fibres, which, when acting, contract themselves, and become shorter. This contraction, according to the different circumstances of the muscle, and the parts to which it is fastened, produces different effects and
different

different motions. Thus, if one end of a muscle is tied to a fixed part, and the other to a moveable one, when it acts, its fibres contracting, will pull the moveable part towards that which is fixed. If both the parts, to which the extremities of a muscle is attached, be moveable, by its action they will be both drawn towards each other. If the muscle be hollow, and contain a fluid, when it contracts, it will press upon and endeavour to expel its contents. Such a muscle is the heart, and, in some measure, the stomach and urinary bladder. If the fibres of a muscle return upon themselves in the form of a ring, when they contract, they will diminish the area within that circumference. Such muscles are employed to shut cavities, and are called sphincters, as in the anus.

A tendon—Is a continuation of muscular fleshy fibres, it being divisible into as many

fibres, or rather bundles of fibres, as the muscle itself is, to which the tendon belongs; but the tendinous fibres are more compacted and smaller, drier and harder, than the fleshy fibres. They are not capable of contraction, but serve like ropes to pull when the fleshy fibres act, for the commodiousness and firmness of insertion, and for the direction of motion.

Ligaments—Are white, tough, flexible bodies, thicker and firmer than membranes, and not so hard or solid as cartilages without cavity, difficultly stretched, and with little elasticity. They serve to connect parts together, and to keep the parts to which they are fixed in a proper situation, as appears remarkably in the articulations or joints. They are made up of fibrous layers or strata; the largest and strongest of which run lengthwise.

Cartilages

Cartilages or *gristles*—Are solid, smooth, white, elastic substances, between the hardness of a bone and that of a ligament, covered with a membrane called *perichondrium*, something similar to the periosteum of the bones. They serve to make the bones, whose extremities they cover, move freely in articulations. They limit the growth of bones as to their length, by hindering the bony fibres from sprouting out, and, therefore, when the cartilages in an articulation are eroded, an anchylosis or immobility of the joint is formed, by the elongation and coalition of the fibres of the bones that are articulated together. Sometimes they serve as ligaments to join bones together; and sometimes they do the office of bones to greater advantage than these would do; as the cartilages of the ribs in the human body, which, by their elasticity, chiefly contribute
towards

towards expiration ; the cartilages that make out the brims of cavities, &c.

Bones—Are the hardest and most solid parts of the body, serving to support the softer and less firm ones in all their motions and pressures. They are covered with a membrane called *periosteum*, which is exquisitely sensible, being plentifully supplied with nerves and blood-vessels. The outsides of bones are commonly more compact and smooth than their inner parts, and are formed of plates, joined together by transverse fibres. Their insides are spongy and cellular, in which is contained marrow within membranous bags, filling up the cells. This marrow, being more or less distributed all over the bones, and transuding through their plates and fibres, makes them tougher and less brittle. The bones are supplied both within and without with blood-vessels and nerves.

Gluten

Gluten—This substance, which constitutes a great part of an animal body, and which cannot be called either fibrous or cellular, is, as has been formerly observed, a mere glue, evasated and concreted not within the fibres, but in the spaces betwixt them by which they are connected, and which gives them a degree of firmness, and constitutes the more simple parts of the animal fabric. That the bones are formed of this compacted gluten is shown from diseases, in which the hardest bones, by a liquifaction of their gluten, return into cartilages, flesh, or jelly. For, all the parts of an animal body, from the softest to the hardest, seem to differ only in this, that the hardest parts have a greater proportion of earthy particles, more closely compacted, with less aqueous glue; and, in the softest parts, there is less earth and more glue.

Having

Having thus given a short description of what are called the solids in an animal body, the fluids, with their different secretions, will be taken notice of in their proper place. But, before we enter upon the particular actions or functions of the living body, it will be highly proper to take into consideration more at large, the use, structure, and importance of the cellular membrane and its fat.

CHAP.

CHAP. II.

*Of the CELLULAR MEMBRANE, or TELA
CELLULOSA, and ADIPOSE MEMBRANE.*

THIS cellular fabric is first met with on dissecting bodies, immediately under the skin, and forms the connection betwixt it and the external muscles. In flaying animals, it requires to be cut by the knife, or forcibly tore, where the connection is more loose, which is well known to butchers and others employed in that office. When slaughtered animals are properly blooded, previous to the taking off the skin, it appears of a whitish colour, and of a woolly like substance *, resembling the pile on velvet,

* *Query*—Might not these woolly like fibres which form the connecting medium between the skin and the body be considered

vet, adhering most intimately to the skin in every point all over the body, even to the very extremities.

This universal membranous substance is not only continued without interruption all over the under surface of the body, but it insinuates itself into every recess. Even the membranous bags which contain the marrow, within the cavities of the bones, are composed of it; and that by far the greatest part of what are called the solids in the body, are made up of, if not entirely framed out of it originally, as will appear more fully hereafter.

The great importance of this cellular substance in the animal fabric will appear from its utility in the animal oeconomy in general, as from it alone proceeds the firmness

considered as hollow tubes which constitute the cuticular pores, the mouths of the exhalent vessels, sebaceous ducts &c.

ness and stability of all the arteries, nerves, and muscular fibres of the body, and, consequently, of all the fleshy parts, and viscera formed from it. Even the figures of the parts, their proper length, curvatures, cavities, and motions, depend entirely on this cellular texture, which, in some places, is of a lax, in others, of a harder fabric. Of this substance, together with the vessels, nerves, muscular, and tendinous fibres, all the viscera, muscles, and glands, with their ligaments and capsules, are composed. Its various length, tension, quantity, and proportion, occasions the difference in the glands and viscera.

This cellular substance is made up of fibres and plates, which are said to be neither hollow nor vascular, but solid, although it is painted by an accession of vessels, which are only adventitious, but no part of its true

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structure. The differences observed in its fabric are, that in some parts of the body it is open and loose, formed of long and distant plates. In others, it is thin and compact, being made up of short concentered fibres; where it is extended over the larger vessels, and forms what are called capsule, vagina, or coats, it is composed of longer fibres, as in the different viscera, particularly the liver and lungs, &c.

The cellular texture is more lax, and formed of plates rather than fibres, where it divides the muscles and their fibres, even to the most minute fibre of which they are composed. It surrounds and sustains the most minute vessels in their free motions, and, as we have seen, enters into the cavities of the bones. It is very lax under the surface of the body, being everywhere interposed betwixt the muscles and the skin.

The

The spaces or intervals betwixt the plates of the cellular membrane are everywhere open, and forms one continuous cavity throughout the whole body. This appears from a great variety of circumstances, as the blowing air into it with a pipe, a practice farriers have when they put rowels or issues in horses, and, by pressure of the hand on the skin, conduct the confined air through the cellular substance to a considerable distance from where it was introduced; likewise from air introduced by a wound in the lungs, which causes a swelling throughout the whole surface of the body, and which is called emphysema; from the passage of bodies put under the skin, to remote parts from that at which they entered; the translation of pus or matter from where it originated to different parts of the body; from diseases, particularly in those where a watery or ferrous humour is deposited into all the cells
of

of this net-like substance throughout the body, and is emptied from them by one single incision made through the skin. We know likewise, that water collected in the cellular substance is frequently absorbed by the veins and thrown out by the intestinal tube, occasioning a diarrhoea.

This cellular fabric appears to possess a contractile power, which disposes its fibres to shorten or contract themselves gradually after they have been distended or lengthened. This power, when excited by cold, renders the skin rigid, raises the hairs, draws up the scrotum, and, after gestation, restores the skin of the abdomen and of the uterus to their former size.

This cellular substance is moistened by a watery vapour, somewhat gelatinous and oily, exhaled out of the arteries, and again taken up by the veins. When this vapour

is

is deficient, the small fibres grow together, the contiguous membranes or plates are cemented into one substance, with the loss of their motion.

We have hitherto considered the cellular membrane in its reticular or web-like fabric, where its cells communicate with each other all over the body. We are now to consider it as forming what is called the adipose membrane, which contains fat or animal oil, (besides the watery vapour and gelatinous fluid formerly mentioned). Some anatomists consider this membrane distinct from the cellular, as it does not form a complete covering, but is in many parts wanting, and its cells not so numerous nor so extensive over the body, being limited to certain parts, and the fat in the cells of the adipose membrane varying in degree of firmness in different parts of different animals, especially in the abdomen. In the ox and sheep it is suet

or tallow; in the hog it is lard; and in the horse, bear, dog, and some other animals, it is grease. This adeps or fat, in live animals, is nearly in a fluid state; in those that are slaughtered and exposed to a cold air, it concretes into a solid substance, especially about the kidneys. Towards the surface of the body, and in the bones, it partakes more of the oily quality.

Whether the cellular membrane and the adipose are really distinct and separate membranes will not, we apprehend, affect the general practice in curing the diseases of animals; the only difference seems to be, that the cells in the former communicate all over the body; in the latter they do not.

Dr HUNTER is of opinion that the cellular membrane is composed of two kinds of cells, viz. the reticular, which communicate

nicate with each other, and the adipose, which are distinct from one another, and do not communicate, but are reservoirs of the animal oil or fat. We shall rest upon his authority, and proceed to describe its formation and use.

Through the cellular substance the blood-vessels run in every direction. From the smaller arterial extremities the fat is deposited not by any ducts or glands, but it transudes on all sides through the arteries, and is deposited under the skin and in its hollows. That this liquid fat or oil is absorbed by the veins, we know from the sudden effects which long continued exercise of the muscles has in wasting or consuming the oil of very fat animals, also from the consumption of the fat in diseases.

The

The uses of the fat are various. It facilitates the motions of the muscles in all parts by lessening their attrition against each other, and to prevent stiffness or rigidity. It fills up the intermediate spaces betwixt the muscles with the cavities about many of the viscera, in such a manner, that it readily yields to their motions, and yet supports them when at rest. It principally constitutes the weight of the body. It conducts and defends the vessels, and gives an uniform extension to the skin, and serves as a cushion to ease the weight of the body, and renders the whole of a comely agreeable shape. It has a principal share in forming the bile; and, by mixing with many of the humours, it abates their acrimony; and, by transuding through the cartilaginous ends of the bones, it mixes with the liquids in the joints, and, by reabsorption, it lubricates their fibres; by exhaling through the pores of
the

the skin, it resists the inclement or drying quality of the air; and, by exhaling from the internal viscera, it lubricates their surfaces with an oily emollient vapour, as we find on opening bodies while they are warm; and, by interposing itself between their integuments, it prevents their concretion.

The fat is deposited into the cellular cells by sleep, rest of body, and a diminished force of circulation of the blood; but, on being collected in too great a quantity, it proves injurious, by compressing the veins and retarding the circulation, by causing too great a resistance to the heart. Hence it occasions shortness of breath, and renders the body liable to apoplexy or dropsy.

The fat being in a liquid state, something like oil, it is taken up by the veins, and, being rapidly moved along the arteries, is con-

fumed by violent exercise, by fever, fasting, preternatural discharges from the body, as diarrhœa, diabetes, or by suppuration of matter. When too much of it is retained in the blood, it increases acute diseases, tinges the urine, and forms a part of its sediment. After a sudden consumption of it, where the juices are good and the humours healthy, it is very soon renewed; but in a languid habit, instead of fat, a jelly or gelatinous fluid is deposited in the cells. Hence arises that species of dropsy called anasarca, and other dropical swellings in different parts of the body.

Recapitulation.—If we conceive a honey-comb, in which every cell opens into all those that are contiguous to it, we shall form some idea of the cellular substance. Its cells are in some places smaller, in others larger; it is dilatable by a very small force, where it is not confined

ed by resistance in its neighbourhood. Where its cells are largest, and its texture loosest, it contains fat, as immediately under the skin, almost over all the surface of the body, between it and the most external muscles; in the intervals or interstices between one muscle and another; in the omentum, mesentery, around the kidneys, &c. Where the cells are so small as not to receive mere oil or fat, as in very young animals, and in many places of the adult body, they contain a gelatinous fluid; or, if still smaller, a vapour of the like nature; and, if all these are wanting, they grow together.

That these cells communicate together all over the body appears, as already observed, from the effects of blowing into it. Butchers, by blowing into a small wound, penetrating quite through the skin, not only raise the
skin,

skin, but fill the interstices between the flesh and muscles, to make their meat look full and plump. In the living body, by a wound, air oft gets into the cellular texture, and produces what is called in surgery an *emphysema*, or a windy tumor, which is sometimes propagated so widely as to cover almost the whole surface of the body; and has been found to have penetrated even into the vitreous humour of the eye. In an anasarca, which is that species of dropfy in which water is contained in the cells of this web, instead of fat or gelatinous substance, &c. there hath been water found got into the cavernous body of the penis, demonstrating the extensive communication of the tela cellulosa.

This membranous web or texture, by laborious dissection, by blowing air into it, by injections, by maceration, hath been
found

found to follow every visible bundle of muscular and tendinous fibres, every vessel, every nerve, every coat or membrane of the viscera, the brain not excepted. We find it constituting a great part of the solid substance of the most important parts, as the oesophagus, stomach, intestines, urinary bladder, &c. It even follows the periosteum of the bones, and with it penetrates into the medullary cavities. So that there is no physical point in the whole animal structure in which there is not a portion of the tela cellulosa cohering and communicating with its main body.

It serves as a bond of union, by tying and fastening all the parts together, yet in such a manner as not to prevent or obstruct their necessary motions; to contain fat where fat is required, or marrow, or a thin gelly or gelatinous vapour; to render
the

the parts smooth, moist, and flexible, and to hinder them from growing together. It yields a commodious passage for vessels and nerves to glide along. It furnishes a considerable part of the membranes, that either line the great cavities of the body, as the pleura and peritoneum, or immediately cover and envelope the particular viscera; of the membranes, of the muscles and tendons, veins and arteries, nerves, glands, and their excretory ducts; insomuch that it may be truly said, the far greatest solid part of the body is made up of it, if it is not all entirely framed out of it originally.

In this cellular membrane, or tela cellulosa, suppuration is formed; sinuses and fistulas run; encysted tumors are bred; and, as hath been before hinted, emphysema and anasarca are formed; perhaps, likewise the seat of rheumatism.

MAL-

MALPIGHIOUS first laid the foundation of the knowledge of the true structure of the *tela cellulosa*; anatomists before him having either no idea at all of it, or, at best, but uncertain, confused, and inadequate notions. In his inquiries into the nature of the fat, he discovered that it was not laid together in confused heaps, but contained in distinct membranous vesicles; and, likewise, that the vesicular texture was spread over all the body, penetrating even into the bones.

After him, RHUYSCH found and demonstrated a cellular texture, where there was no fat, in many places, and therefore termed it *cellulosa*, preferably to *adiposa*. LEWENHOEK'S microscopical discoveries agreed with RHUYSCH'S preparations.

BOERHAAVE united all the discoveries relating to this subject that had then been made,


made, and digested them into a comprehensive elegant summary, in his Preface to the *Leiden* edition of the *Autores varii de Morbo Gallico*.

Since that time, various anatomists have added useful observations and improvements. But, of all authors, Professor HALLER hath most distinguished himself: he hath repeated the old experiments, added new ones, and delivered the result of the whole in his *Primæ Linæ Physiologiæ*.

CHAP.

CHAP. III.

Of the HEART, its PERICARDIUM, and CIRCULATION of the BLOOD.



WE have in the former chapter shewn that the living body may be fitly compared to a circle, as all the actions or functions of its different parts are in such a state of mutual dependence upon, and connection with one another, that, at whatsoever part we begin to explain the animal economy, we are obliged to suppose

or assume, as already known, something which hath not as yet been touched upon.

To prevent the beginner's being embarrassed by this intricacy, we have given short and plain definitions, likewise descriptions of the different classes or species of the fundamental constituent solid parts of the body; that, where their names occur, the young reader may have some idea, not only of the meaning of the terms, but likewise of the general uses of the parts expressed by them.

We judged it also necessary to give a pretty comprehensive account of the cellular membrane, which ties together all the parts, at the same time preserving their fitness for motion; and likewise contributes a large share towards their organical structure and composition.

We

We now begin to consider the body as alive, with its fluids and solids moving and being moved, acting and being acted upon mutually by each other.

We shall first explain what life is, wherein it precisely consists.

Life consists in the action of the heart, and the motion of the blood influenced by that action.

Where the heart is perceived to beat, there we pronounce life to be, though no other function be exercised; and, where we are certain that the heart is entirely at rest, we cannot with reason affirm that there is life.

The action then of the heart propelling the blood is corporeal life; and, where there
is

is only this action, and no other, there is the smallest degree of life.

But this smallest degree of life would quickly be at an end, if there was no other function added to it. The function most immediately connected with it, and most necessary towards its support and continuance, is respiration or breathing. Hence living and breathing are joined together, to fill up the idea and express durable life. If respiration is stopped any how in a born animal, that is furnished with lungs, life is quickly destroyed.

But farther, as the heart is a muscular organ, which by its contraction propels the blood throughout the whole body; and as some influence or other of nerves is indispensably requisite to exercise muscular motion, as was observed in the definitions; and as the nerves of the heart
are

are propagated from the brain (by which is meant all that pulpy substance within the cranium, whether brain, strictly so called, cerebellum, or medullary substance) therefore, as the heart is supplied with nerves from the brain, some action or influence of the brain and nerves, whatever that be, is necessary to maintain the action of the heart.

Hence, therefore, the action of the heart propelling the blood ; respiration or breathing ; and the influence of the brain and nerves, that causes and keeps up the action of the heart, must concur to constitute life of any considerable duration, such as we are now considering.

Here we may observe that, in the living animal body, there is a real perpetual motion during its existence ; the heart, the organs of respiration, and the brain, act upon one another

another in a circle with an undiminished force, while the structure of the machine, and the condition of its fluids, remain unimpaired.

As therefore life, properly and precisely speaking, consists in the action of the heart, and the motion of the blood thereby influenced, we shall first take a general view of its situation, its connection with the neighbouring parts, its fabric or structure, so far as is necessary to comprehend the account we are to give of its action, and then proceed to the other functions that are most closely connected with it.

And here we would observe, that it is not intended to enter minutely into the anatomical description of the parts as we go along, but only so far as may be necessary to point out the general fabric or structure,
the

the situation and connection of the parts described, as descriptions of this kind would be difficult to follow out; by which the connection between the function and the structure might be lost.

The heart is situated in the left part of the thorax or chest. It is nearly of the shape of half a cone; that is, the segment of a cone cut through its axis, from its apex to its base, with a blunt apex or point. It therefore hath one side pretty plain or flat, and the other round or convex. It lies transversely, and somewhat obliquely, with its broad end or basis towards the right, and its apex or point towards the left side; the apex being somewhat lower than the basis.

The heart is covered all over with a very strong and tough membranous bag, called
pe-

pericardium. This bag is firmly fastened to the great vessels that enter into, or issue from the heart, and to the mediastinum and sternum, it is not connected with the diaphragm, as in the human subject. The pericardium is loose from the body and apex of the heart; and, as it is larger than the heart contained in it, it allows it room and liberty to be contracted and dilated freely, and without confinement.

The outer surface of the pericardium being spread over with the cellular substance, gives it a rough appearance; but internally, it is very smooth and highly polished, and contains a watery warm vapour called *liquor pericardii*.

This liquor, in our subject, in a healthy state, is but small in quantity, and proportioned to the size of the heart, it varying in proportion

proportion to the size of the animal. It is either limpid yellowish or reddish, and subviscid or gelatinous. It is of a lymphatic nature, and is found to harden by heat into a jelly. It is separated without any intermediate glandules, or any visible pores, from the small exhaling arteries of the heart, auricles, and pericardium.

This *liquor pericardii*, by disease, is sometimes increased to a very considerable quantity : it then constitutes a dropsy of the pericardium. On the other hand, if its quantity is dried up, diminished, or any how deficient, the pericardium, in consequence of inflammation, adheres to some part of the heart, or to its whole surface, by which the action of the heart is greatly impeded, and death is the consequence.

The pericardium serves to add to the firmness and support of the heart, it being, as we have said, not only fastened to the great vessels, but to the mediastinum and sternum. It likewise contains within it a watery warm vapour, to preserve the surface of the heart moist, smooth, and pliable to its incessant reiterated strong contractions and dilatations; therefore all animals that have two ventricles to their hearts are furnished with a pericardium.

The heart itself may be divided into its body, and two appendixes called auricles. Its body comprehends two large cavities called ventricles. Both the auricles and ventricles are commonly distinguished by the names of right and left; though, considering the true position of the heart in the horse, they might be more properly termed anterior and posterior; but we shall retain the usual names, of right and left.

The

The *Heart*—Is situated, as we have said, in the left side of the thorax, and within its sac or pericardium, where it is supported and retained in its situation by the large blood-vessels which open into or issue from it; its base being the most elevated part, facing the dorsal vertebræ; its apex or point, the lowest, is directed to the left side of the sternum. Its fabric appears to be composed of muscular and membranous fibres, running in various directions, very difficult to unravel.

Auricles—Are two muscular and membranous bags or appendages situated on the base or broad end of the heart. They are divided by a septum or partition, and have no communication with one another. They are likewise divided into the right and left auricles, and each corresponds with its ventricle on the same side. Their office is to receive the blood from their corresponding veins,
and,

and, when filled, the blood, partly by its own gravity, together with the muscular contraction of the auricles, on the opening of certain valves, falls down into their respective ventricles, where, from the particular construction of the parts, hereafter to be described, the blood is, by the muscular contraction of the heart, thrown into the arteries which convey it to its destination.

Ventricles—These are two large cavities within the muscular body of the heart, situated below their respective auricles, and are, like them, termed right and left, or, more properly, anterior and posterior. Each of these ventricles have two openings, one from the auricle above them, the other more laterally, which forms the mouth of a large artery, and which receives the blood. The ventricle, when it contracts, propels the blood into its corresponding artery. The right ventricle conveys it to the lungs;
from

from thence it is returned by the veins to the left auricle and ventricle, which distributes it throughout the whole body, the lungs excepted.

The right ventricle is the wider and shorter of the two; the left the narrower and longer, reaching farther towards the apex of the heart than the other. The left is likewise much stronger, and its walls thicker. There is a very thick impervious septum or partition betwixt them, hindering all communication between, or opening into one another. The ventricles in an adult human subject, when distended, contain each between two and three ounces of blood. Dr Bracken alleges the ventricles in the heart of a horse throws out at each contraction four times as much blood as that of a man; but regard must always be had to the size of the heart. The right is generally reckoned the more capacious of the two; but,

but, in the live body, they must be pretty nearly equal, as will appear from an account of the action of the heart.

Both the body and auricles of the heart, besides blood-vessels, nerves, membranes, and fat, consist of different strata, or layers of muscular fibres, running in various directions. Here it may be sufficient to observe, that such is their position and course, that every part of the cavity, both of auricles and ventricles, by their contraction, is so pressed upon as to be entirely evacuated; though the thickness is very unequal in different parts of the wall of the heart.

Into each auricle large trunks of veins open. Into the right, the *vena cava ascendens* and *decendens*; or, as some call them; anterior and posterior, which, meeting at that auricle, form a large pouch or sinus, called

called *sinus venosus* of an uneven surface, having indented edges hanging downwards, something like the comb of a cock.

The two or more large trunks of the veins, belonging to, and returning from the lungs, called the pulmonary veins, in like manner form a sinus, opening into the left auricle.

The right ventricle sends out of its upper and wider part a large arterial trunk, called the pulmonary artery, which is distributed through the substance of the lungs, dividing into smaller and smaller vessels, and branches as it proceeds.

The left ventricle sends out likewise from its upper and wider part another large arterial trunk, called the *aorta*, or *arteria magna*,
which

which by its ramifications is distributed all over the body.

We have then two auricles and two ventricles; the auricles opening into their respective contiguous ventricles; the auricles receive each a large venous pouch or sinus; and the ventricles send out each a large arterial trunk. Let us now begin to consider the action of the heart, and rudely sketch out the course of the blood from and back again to the heart, commonly, and not improperly, called its circulation; which shall be more accurately and minutely described afterwards.

But first let us remind the reader of what was said in the definitions concerning a muscle; viz. that it's essential characteristic is to consist of fleshy fibres, which, when acting, contract themselves; that therefore,
if

if the muscle be in the form of an hollow vessel, such as the heart is, and contains a liquid, it will by it's action endeavour to expel that liquid. This, we must keep in mind; and assume as known, until we come to treat professedly of muscular motion.

The blood returning through the lesser veins, from the different parts of the body, is at last gathered into the two large venous trunks already mentioned; viz. the *cava ascendens* and *descendens*, or anterior and posterior, which meet at the right auricle. This conflux or sinus opens principally into the right auricle: The auricle and sinus, when filled to a due degree, being irritated by the blood filling and distending it, contracts by its muscular power, and propels its contents into the right ventricle, with which it hath a patent communication.

This ventricle, when sufficiently filled, partly by the blood which filled the auricle, and partly from that which comes into it directly from the sinus, on the opening of the valves, without touching at the auricle at all, (for as the ventricle is greatly more capacious than the auricle, all the blood the latter could throw into it could not sufficiently distend it, and furnish such a quantity as it throws out at every contraction): The right ventricle, when sufficiently filled and distended, likewise being irritated, exerts its muscular power, and by its contraction forces the blood it contained into the pulmonary artery, that rises out of it, and so through the lungs; from which it returns by the pulmonary veins into the left auricle, from thence it is propelled into the left ventricle, which sends it into the aorta, and through its small branches distributes it over all the body. From the
smallest

Smallest branches of the aorta it is taken up by the smallest veins, which are only the minute arteries continued, and turned back towards the heart; and by them it is again returned to the venous sinus and right auricle; and this circulation is incessantly reiterated.

To represent it still more compendiously, the blood from the conflux of the *cava ascendens* and *descendens*, or anterior and posterior, flows into the right auricle, and from thence into the right ventricle. From the right ventricle it is sent into the lungs through the pulmonary artery, and by the pulmonary vein returned to the left auricle, from that into the left ventricle; out of which it is propelled through the aorta, and by its minute ramifications distributed all over the body; then being taken up by the beginnings of the veins, is again brought to
the

the right sinus and auricle ; and this route is renewed and continued without ceasing.

This is a rude sketch of the course of the circulating vital fluid, of which we have as yet only drawn the outlines, that the beginner might not be embarrassed by attending to too many things at once. We shall, as we proceed, finish higher, and add more truth to the piece.

And, first, let us observe, that the muscular contractions of the auricles are not performed in the same successive order of time we were obliged to mention them in for method's sake ; but the two auricles contract at once ; and, during their action, the ventricles are passive, suffering themselves to be dilated and filled.

And

And *vice versa* the two ventricles, when completely filled, contract at one and the same time ; and while they are contracting, the auricles are filling. In this manner are the auricles and ventricles alternately filled and evacuated, as appears not only from the nature of the thing, but from the opening of live animals. These alternate contractions and dilatations of the heart are called its systole and diastole. During its systole or contraction, the blood is pressed from the ventricle into the arteries. In the diastole or dilatation, the ventricles are passive, and receiving the blood from the auricles.

Now that these alternate contractions and dilatations, these fillings and emptyings might be performed completely and truly, with an uniform and regular constancy, nature (by which is always to be understood the supreme author of nature) hath placed wonderful

derful contrivances where they are required ; which we shall now briefly explain.

When the right auricle and sinus is contracting, the current of the blood flowing towards the auricle, together with the weight of that portion of it which returns from the head and upper parts by the *vena cava descendens*, or anterior, determines the blood contained in the right sinus and auricle upon their action into the contiguous ventricle.

From the mouth of the ventricle there arises all around a membranous broad ring, which is undivided at its origin, but, when extended into the cavity of the ventricle, parts into three unequal portions or scollops, the extremities of which being strengthened by tendinous fibres, are fixed partly to the walls of the ventricle, and partly to the fleshy columnulae within it ; but in the intermediate

intermediate spaces, betwixt their origin from the mouth of the ventricle to their fixed points within it, are free and loose. These three unequal portions of this membrane, being somewhat triangular, are called *valvulae tricuspides*.

While the blood, by the contraction of the sinus and auricle, is passing into the ventricle, this membrane and its scollops give way to the current, being pressed to the sides of the ventricle; and particularly the largest portion is made to cover the passage into the pulmonary artery, that no blood may get into it by the feeble effort of the auricle, but wait for the due *impetus* from the ventricle.

When the ventricle, being sufficiently filled and irritated, contracts, its cavity being every way diminished (and when the contraction

traction is completed, the cavity is quite annihilated, the ventricle being perfectly emptied) the blood seeking an outlet every way, and getting between the walls of the ventricles and the loose parts of the membrane or valves, drives them inwards towards the axis of the ventricle, and towards the auricle and sinus, so as to hinder the return of the blood by the way it came. They are stayed by their insertions into the walls and columnulae of the ventricle ; and hindered from being driven too far back and strained. At the same time the orifice of the pulmonary artery, that before was covered by the largest of the valvular portions, is now left open ; and it being the only outlet the blood can find, its course is all determined that way, and it rushes into the pulmonary artery with the full force of the contraction of the ventricle.

There

There is another contrivance much of the same kind, to hinder the return of the blood into the left auricle and sinus, when the left ventricle is contracting; with this difference, that, instead of three in the right, there are in the left only two membranous productions or valves, and these, from some similitude to a mitre, are called *valvulae mitrales*.

There are besides, at the mouth of the pulmonary artery, and at the mouth of the aorta, in each of these places, a set of valves, three in each set, called from their figure *sigmoideae* or *semilunares*. These, when the blood is expelled out of the ventricles by their contraction, give way, and are pressed flat against the walls of the arteries. But when the ventricles are emptied, and the arteries begin their contraction, the blood, seeking an exit every way, gets between the

loose margin of the valves, and the walls of the arteries, and forces all three back at once. These valves are of such a figure, that when pressed fully back, they are united nearly into the figure of a circle (like the head of a drum). But as, without some special provision, there would be something of a vacancy in the middle of this circle, of a triangular figure, nature hath placed, in the middle of the margin of each valve, a round fleshy substance or papilla; all which three, when pressed together, fill up so much space, and strengthen the middle weak spot, making the valves play firm and true.

All these different sets of valves, viz. the *tricuspidæ* at the entry of the right ventricle; the *mitrales* at the entry of the left; and the two *femilunares* at the mouths of the great arteries, that issue from the ventricles, may be compared in some measure to locks
made

made on navigable canals, which, when a boat hath got so far, by being shut after water is let in, prevent the boat from being driven back, and secure the progress already made.

These valves are more conspicuous and robust in the left side of the heart than in the right, as the left ventricle is vastly thicker, and better stored with muscular fibres; and therefore, contracting with greater force, requires a firmer structure of valves to stand the stress they are put to.

But, over and above all this, there are within each ventricle, and in an inferior degree within each auricle, fleshy muscular productions or columns, which we have had occasion to mention before, some running one way, and others another, firmly attached

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ed at both ends to the sides or walls of the ventricles.

These columnæ or pillars serve a variety of purposes. They prevent the heart being too much strained or distended during its diastole or dilatation. They likewise assist in the systole or contraction of the heart, by contributing their share of muscular contraction, as they consist of fibres of the same nature and properties with those of the walls of the ventricles. They compress and help to keep fluid the blood, which is so often and so repeatedly dashed against them; and, by giving a degree of support to the valves, they direct and determine their motions. And, by filling up room, they render the complete evacuation of the ventricles practicable, which could not be brought about otherwise, as an hollow muscle, if it were quite smooth and even in the inside, could

could not by contraction altogether annihilate its own cavity.

So many various and important ends hath nature gained at once by this plain and simple mechanism.

The heart, besides the great vessels that either open into it or issue from it, hath proper vessels of its own, called coronary, pervading its substance, and supplying it with vital fluids, both arteries and veins. The arteries, almost always two in number, arise from the great trunk of the aorta, a little beyond the semilunar valves, and furnish the heart with innumerable branches. RHUYSCH hath given an excellent figure of their origin and distribution.

The evanescent branches of these arteries terminate in beginning veins, as in other parts


parts of the body ; and the trunks of these veins empty their blood some of them into the right sinus and auricle, others into the right ventricle ; and some, but fewer, into the left sinus and auricle, and left ventricle.

By this means the heart is supplied with the vital stream expeditiously to influence its restless and rapid functions.

The heart is supplied with nerves from the cardiac plexus, and from the lowest cervical, making various inosculations with the intercostal, and joining with those of the eight pair.

CHAP. IV.

*Some Diseases of the HEART. Circulation
through the ARTERIES and VEINS. Of
ANEURISM ; and VARIX.*



WE have in our last chapter, after explaining the structure of the heart, exhibited a general sketch of the circulation of the blood ; and discoursed particularly and minutely on these circumstances of it, which immediately concern the heart itself ; and, in so doing, have given an account

count of the action and uses of its different parts.

We have seen the rout of the blood to be from the meeting of the two trunks of the anterior and posterior venae cavae into the right sinus and auricle of the heart; from thence into the right ventricle; from thence through the pulmonary artery into the lungs; from which it returns by the pulmonary veins to the left sinus and auricle; from thence it is sent into the left ventricle; out of which it is expelled through the aorta, and by its infinitely numerous ramifications distributed all over the body; and at length is taken up by the beginnings of the veins, which are a continuation of the most minute evanescent arteries; and by them returned to the right auricle and sinus, from which we considered it at its first setting

ting out. And thus it repeats its incessant round.

We have seen that the auricles and ventricles of the heart act by their muscular force, and that this force is excited by the irritation of the blood thrown into them successively, and distending their cavities; and therefore the contraction and dilatation, or systole and diastole of the auricles and ventricles, must be alternate.

We have likewise considered the wonderful contrivances of nature to make all these motions true and complete, in valves which hinder the blood from being beaten back towards the places from whence it came; and the fleshy inequalities or columnae in the insides of both auricles and ventricles, especially the latter, by the assistance of which, besides other important

ends, the complete evacuation of these cavities is effected.

We should now proceed to consider what remains next to be particularly explained of the circulation, in that part of it which immediately relates to the arteries and veins.

But while the structure of the heart is fresh in the mind of the reader, we shall, agreeably to our plan, take notice of some of the most remarkable diseases of that part, in order to give a general idea of their nature, and the general curative indications where they are curable, which will show the usefulness and connection of the knowledge of the animal oeconomy with that of diseases and their cure.

The

The first disease we shall take notice of is the dropsy of the pericardium.

We observed, that the principal use of the pericardium is, by its close impervious structure, to confine within its cavity a warm aqueous animal vapour, to moisten and lubricate the surface of the heart; and thereby to preserve it in a fit condition to continue its incessant rapid actions; and, therefore, that every animal, whose heart hath two ventricles, is furnished with a pericardium.

This vapour must be supplied by extremely small vessels opening into its cavity, either from the convex surface of the heart, or the concave surface of the pericardium, or both. It cannot come from without the pericardium; for the same impervious structure that confines it when collected,

collected, must exclude its admission from without.

It must likewise be constantly renewed, that is, some of the old must be reabsorbed, while the new is gathering. If it were always accumulating without any part being carried off, the heart would soon be drowned in water. If there was no fresh vapour ever admitted, what is already within the pericardium would in process of time become rancid and acrid, and therefore unfit for its purpose, from the nature of animal juices, which tend to alkaline acrimony, especially when pent up in so warm a place.

Therefore there must be a constant renewal of this vapour; and that the same, or nearly the same quantity of vapour may be kept up, there must be the same, or nearly the same
the

the same, quantity furnished, as there is absorbed.

But if the quantity reabsorbed is remarkably less than that furnished, the quantity of vapour must gradually increase. And as the vapour is only water or lymph impregnated with animal principles, and rarefied; as its quantity increases, since it cannot make its escape through the pericardium, it will become denser and denser, and at length become downright palpable water.

This is the origin of water or dropfy in the *pericardium*; and not only of this one sort of dropfy, but of every kind that is formed within any remarkable pre-existent cavity whatever. Such is the importance of the knowledge of the animal œconomy in the practice of physic.

Thus

Thus an ascites or dropfy in the abdomen is only the fame thing happening within the peritonaecum, which we have been now explaining, concerning the pericardium. In the cavity of the abdomen there is a vapour, which hinders the parts from growing together, and to the peritonaecum. This vapour is very observable in opening a new killed animal, while it is warm.

If this vapour is not absorbed in proportion as it is furnished, an ascites enfues, and not as hath been imagined by some anatomists, from the rupture of lymphatic vessels.

The general causes of dropfies are a poorness of blood, whereby its watery parts abound too much, and are too easily separable from its other principles ; together with a weaknefs or laxity of the solids.

The

The indications of cure are, besides letting out the burthenfome water by chirurgi- cal operation, where it is practicable, the dif- charging it by hydragogue purges, and diu- retics, thereby promoting its reabforption by emptying the veffels, and reftoring the tone of the folids by proper ftrengtheners, friction, and exercife. A drying diet is here indifpenfibly requifite.

Water is collected in the fame manner in the thorax, between the folds of the mediaftinum; and which is called hydrops pectoris; in the ventricles of the brain, and there it creates lethargy or apoplexy; with- in the fcrotum, and in other places.

Anafarca is an effufion of water in the tela cellulofa, inftead of fat, or a gelatinous fluid, as hath been hinted in the introduc- tory chapter; and differs from afcites, and
other

other local dropfies, by having no circumscribed feat; we only mention these local dropfies at present, as they will fall more properly to be considered hereafter.

The next difeafe we fhall touch upon is polypus of the heart.

This is a flesh-like concretion found in the ventricles of the heart, or the beginning of the trunk of the aorta. We do not mean these flight coagulations, which are found within the heart in most fubjects, and which are formed there in the agonies of death, when the heart contracts fo weakly as not to expel all its contents, and fo gives the blood time to form into clots by ftagnation in its cavity. But we mean these more folid concretions, which are rooted amidft the fleshy productions or columns of the ventricles; and which by their firmness

ness evidently appear to have been of some considerable standing.

But the causes of both are the same: Part of the blood thrown into the ventricle remains there amidst the interstices of the fleshy productions; and, not being afterwards expelled, becomes the nucleus or bottom, to which every succeeding impletion of the ventricle gives a new addition of substance, by the adhesion of some part of it, especially its serum, to the nucleus. The strong action of the heart compacts all into a firm substance, and makes it fast to the walls of the ventricles, amidst the interstices of the fleshy productions, by the attraction of cohesion. In the mean time, its bulk increasing, it extends itself in different directions, and multiplies its root or feet; whence it hath its name, *polypus*, that is, *multipes*, many-footed; and creates un-

easy symptoms, the principal and most distinguishing of which is a grievous palpitation of the heart upon slight motions of the body; and at length death is caused by its motion being totally stopped.

In the human body, those persons are most liable to polypus of the heart whose blood is very thick, and who are of an atrabilious temperament; especially if they at the same time are liable to fainting fits; which gives the blood opportunity and time to coagulate within the heart.

There is no certain cure mentioned by authors for this dreadful disease in the human body. What seems to bid fairest for one is the constant use of soap, or a proper lixivium, washed down with great quantities of a decoction of galls roots, or of
galls

grafs itself in the summer, continued for a long time together.

The virtues of grafs and its roots have long been known and recommended by the most eminent physicians as a powerful dissolvent of those concretions, which take place in the human billiary ducts, and mention cases where it has been prescribed with the greatest success*, and we have every reason to think, that it will be equally powerful in dissolving cohesion in the animal fluids.

The heart and pericardium, like other viscera, are liable to inflammation. This disorder is called *carditis*, and not easily distinguished from inflammation of the lungs or mediastinum.

* Van Sweiten in his Commentaries upon the Aphorisms of Dr Boerhave, Vol. IX. p. 177.

mediastinum. But on carefully attending to the symptoms in the carditis, the breathing is less difficult, together with a small quick irregular pulse, from the first attack of the disorder, which must be treated in the same manner as all local internal inflammations by adhering strictly to the antiphlogistic regimen.

Having already considered the motion of the blood through the heart in all its parts, we shall next trace its course through the arteries and veins, and explain their different offices, their structure, and their manner of being branched out and distributed.

As we have said before in the definitions, arteries are canals or vessels, which convey the blood directly from the heart to the other parts of the body. They are in colour whitish, and more so in dead subjects than in living bodies, as the small vessels,
that

that run along their membranes, are then empty and collapsed. They are conical, tapering gently from the heart forwards, which appears most evidently in the larger arteries, where they run for any length without sending off branches. But, as the number of branches increases by division and subdivision, they gradually come nearer to a cylindrical figure; till at length, in the smallest branches of all, which are termed capillaries, (that is, as small as hairs), though in reality they are much smaller, their figure is altogether cylindrical. These capillaries are continued to the origins of the veins, the latter being no other than the former reflected or turned back towards the heart.

At every division of an arterial trunk into branches, the sum total of all the cavities of the branches is always greater than the cavity of the trunk, from which they immediately proceeded.

Hence

Hence the cavities of all the capillaries taken together must be immensely greater than the cavity of the aorta, where it issues from the heart.

Such arteries as are large enough to be examined by anatomical methods of enquiry have been found to consist of the following different coats or membranes.

The outermost of all is an adventitious thin membrane, continued from the general membrane of the neighbourhood where the artery runs ; as in the thorax from the pleura, or from the pericardium ; in the abdomen from the peritoneum ; in passing through the cranium from the membranes of the brain, &c. This coat is, as we have observed, adventitious, and only follows the artery for a space, and then abandons it ;
and

and therefore is properly speaking no part of the artery.

The next coat is found to be cellular, and of the texture we have described in the introductory chapter. In this coat the texture becomes closer and more compacted, as it approaches nearer to the cavity of the artery.

The coat immediately under the former is muscular, or at least fibrous and muscular like. Its fibres are circular; not indeed continued quite round; but disposed in a better manner for cohesion and strength; as each of them describes the far greater part of a circle; then, as it were sinking down, is fastened to the rest of the same kind. This happening to different fibres in different parts of the cylindrical wall of the artery; and there being several
strata

strata or layers of such fibres, makes a firm coat, and constitutes the chief strength of the artery, either to resist dilatation and rupture, or to restore itself, when distended, to its former narrowness.

This series of circular fibres appears in some places of the aorta to be fleshy and truly muscular.

Immediately under the last mentioned coat, betwixt it and the innermost of all, there is some cellular substance, which, being very short and minute, is difficult to be demonstrated ; but, after long maceration in water, is to be shewn.

The innermost coat, or that which the blood rubs against in gliding along, is a fine thin membrane, smooth in the inside, being polished by the current fluid. By
duc

due maceration, it may be separated from the cellular texture that lies between it and the muscular coat.

It serves as a lining to the other coats; and to hinder the globules of blood from separating and tearing asunder the muscular fibres; and therefore contributes not a little to the strength and durableness of the arterial frame.

Besides these coats and membranes, there are blood-vessels, both arteries, veins, and nerves, that run upon the coats of the larger arteries. These run in the outermost cellular substance, under the first and adventitious coat. These arteries by successful injections appear very numerous, as may be seen in Rhuyſch's figures.

The veins arise, as we have before observed, from the small evanescent arteries at the surface and extremities, becoming cylindrical, and turned towards the heart. From numbers of small twigs uniting larger and larger trunks are gradually formed, till at length they are gathered and united into the great venous trunks that open into the heart.

They are, like the arteries, branched out in such a manner, that the sum total of the diameters of the branches is always greater than that of the trunk they compose.

Their coats are thinner than those of the arteries, (which thinness renders them in some measure transparent,) but their texture is closer; and, according to late experiments, they are found to be tougher and stronger,
in

in proportion to their thickness, than that of arteries.

They are very difficultly separable into distinct series of membranes; and it is but in a few places where any thing like muscular fibres can be found in them.

When they are emptied and cut through, they do not maintain their circular sections as the arteries do, but fall flat, and discover less elasticity.

They are both larger and more numerous than the arteries, as may appear from the many large cutaneous veins on the surface of the body, that have no arteries corresponding to them. Infomuch that the sum total of their cavities may be fairly reckoned four or five times larger than that of the arteries.

Within

Within their cavities in many places there are valves, that is, pretty strong membranous substances, the one end of which is fixed to the inside of the walls of the veins, and the other projects loose into its cavity towards the heart. They are most commonly placed together in pairs, sometimes single, and sometimes triple. Their use is to prevent the blood's being beaten back through the veins by any force or pressure, whereby the uniform reflux of the blood to the heart might be disturbed. And so truly are they adapted to that purpose, that if we try to inject any fluid into a venous trunk furnished with valves, from the heart towards the extremities, it will burst before the valves give way ; and hence the venous system cannot be injected and demonstrated like the arterial.

Having

Having delivered the structure and principal properties of the arteries and veins, we come now to explain minutely, the way and manner in which the circulation of the blood is carried on from the left ventricle of the heart, and the beginning of the aorta, back to the right auricle ; that is, the motion of the blood through the arteries and veins.

Let us then suppose the left ventricle already fully distended with blood just beginning its systole or contraction. At this precise point of time, the arteries are the emptiest, having immediately before restored themselves by their contractility to their greatest narrowness. The ventricle by its muscular force, which is very great, throws its contents into the aorta. The blood behind pushes on that before ; that before creates a resistance to that coming behind through the whole
arterial

arterial system. As the arteries, by being divided and subdivided, become gradually smaller and smaller, the resistance is gradually increased by the increase of the surface, and the friction which is proportionable to the surface, and therefore at the capillaries is greatest of all, in which microscopes have sometimes shown a single red globule of blood filling the whole cavity of the vessel. This resistance is somewhat enhanced by the tapering figure of the arteries.

Hence when all the blood is thrown out of the ventricle, the arteries, by the quantity and impetus of the blood thrown into them, and by the resistance it meets with in its progress, especially in the capillaries, must be distended, as they are yielding and dilatable; and this state of distention, which is called their diastole, must keep
time

time with the contraction or systole of the heart.

But when the arteries are fully distended, as the impetus ceases, the distending fluid being no more supplied, they will be left at liberty to contract themselves, which they do either by the muscular action of their circular fibres, or by their natural elasticity, or both, (but we believe much more by the latter than the former), and so endeavour to expel the blood out of their cavities, which, agreeably to the nature of a fluid, will endeavour to recede from the pressure wherever there is a passage.

But there can be no other way for the current of blood to make its escape, but either back towards the heart, or forwards into the
veins,

veins, unless the arteries should burst, which is out of the question.

Now, in the effort the blood makes to return to the heart, it forces back the three semilunar valves at the mouth of the aorta, which, when fully acted upon, are united together into one complete circular surface, so as to shut up its cavity, as we have already explained, and prevents all regurgitation that way, except perhaps into the orifices of the coronary arteries.

As the veins are in their beginnings extremely small, being only the arterial capillaries continued and reflected or turned towards the heart, and, by uniting, form gradually larger and larger trunks, the blood will be urged through them with a pretty constant and uniform current: for both the diastole and systole of the arteries will

will keep it urging on. This current, the larger the veins are, and the nearer to the heart, will be the more rapid ; because the diameter of the cavity of every trunk of a vein is less than the sum total of the diameters of all the branches that compose it, though it is always larger than any one of them singly. Hence, therefore, the velocity of the motion of the blood, in the two great trunks of the anterior and posterior cavas, will be the greatest of all, where they open into the right auricle and sinus, sufficient to supply the necessary quantity of blood to be propelled and pass through the heart.

The dilatation or diastole of the arteries is called the pulse ; which is so much attended to in the practice of physic. The veins have naturally no pulse, because in them the blood flows from smaller canals into wider ; its current into their beginnings is

more equal and uniform ; and the stop, or remora at the right sinus and auricle, is next to nothing ; for while they are filling, the venous blood is proceeding on, and while they are contracting, there is room making for it to be accumulated ; so that in a natural state there is no cause worth considering to drive it back into the venous system ; and therefore the venous system can naturally have no pulse, at least none that can be distinguished in any vein so remote from the heart, that we can examine it in. Besides, their structure is not so susceptible of pulse as that of the arteries, even though the same causes should be supposed to act upon them ; as they are not easily dilatable beyond their common tone, nor have they that contractile power to restore themselves, when dilated, that the arteries have.

On the other hand, the arteries are easily dilatable, and capable of again restoring themselves ; they are filled with great force and rapidity, by the sudden squirt of the left ventricle, and the resistance at their capillary terminations is very great.

We have observed, that the veins have no pulse naturally ; but in dying animals there has been sometimes perceived a fluttering in the veins, resembling a pulse, occasioned by an extraordinary stop at the heart, which causes a repulsion of the blood from the right auricle into the trunks of the veins at the heart.

Thus, we have hitherto gone through the action of the heart and the motion of the blood through it ; and its course through the arteries and veins back to the heart, through the greatest part of the body, which

which is called the major or greater circulation.

There remains now, to complete our account of the circulation, to describe its passage through the lungs, being the minor or lesser circulation; but as respiration is necessary to expedite that passage, and as that function demands a particular chapter by itself, we shall here only observe, that the modus of the circulation of the blood thro' the lungs is in general the very same with that in the rest of the body; the blood is thrown out of the right ventricle of the heart into the pulmonary artery and all its ramifications. The pulmonary artery hath semilunar valves near its origin like these of the aorta, which hinder the regrefs of blood towards the heart. These arterial branches no doubt have some kind of pulse like the branches of the aorta; and propel in the same

same manner their blood into the beginnings of the pulmonary veins; and at length to the left auricle. So far they agree with the vessels of the rest of the body. The material difference as we have said is, that respiration is necessary to co-operate with the action of the right ventricle, in order to propel the blood through the lungs. In the meantime, if we assume this as explained, we have had the whole of the circulation before us.

We have already mentioned the velocity with which the blood comes from the heart, together with the celerity and force with which it is driven through the arterial system, which demonstrate the great muscular powers of the heart, especially if we take in to the account, the great resistance that complex muscle overcomes in the capillary vessels, from friction, tenacity of the blood, &c. together with

with the weight of the whole mass of blood in the body, the quantity of which, in our subject, the present state of veterinary experiments have not as yet nearly ascertained, but in the human body it is computed to be about 51 lib. and upwards. Yet that great mass of fluids, although become stagnant in persons recently drowned, or that have fainted, are easily put into their former motion by the heart only.

It is likewise computed that the heart in man drives forward a weight of 51 lib. of blood, with a velocity by which it might run 149 feet in a minute, which force it exerts 4,800 times in an hour, yet notwithstanding this incessant perpetual motion of the heart, we are never sensible of its being tired through such a number of years as there is in one's life. Through so many days as there is in a year, or through so many

many hours as there are in a day, when in each hour the heart of a person in health, contracts not much less than 5000 times. So frequent does these repletions followed with new contractions go on perpetually in the same order. Nor is there any muscle beside the heart and diaphragm but what becomes tired, wearied, and painful, by acting incessantly even for a few hours only.

The dilatation or diastole of the arteries is called the pulse, which is so much attended to in the practice of physic, and ought to be carefully attended to by every veterinary practitioner, by making themselves acquainted with it first in a healthy state, by which they will be enabled to judge how far it may be deranged in disease.

The

The pulse varies in its motion in different animals, and even in the same species it varies in proportion to their size. Small animals have a quicker pulse than the larger; young than the adult. We ought to keep this always in mind, and likewise to be careful that the animal whose pulse we are making our observations on, be noways alarmed or frightened. In small horses about 12 or 13 hands high, the pulse will beat about 49 to 54 strokes or pulsations in a minute, in larger horses from 44 to 50. But in disease, the action of the heart and arteries are very materially influenced, by which the circulation of the blood may be increased or diminished, according to existing circumstances, and the nature of the disease at the time.

The principle disease to which the arteries are liable, are aneurism and ossification.

tion, the former are of two kinds, the true aneurism and the spurious. Although this disease is seldom met with in the extremities of our subject, yet it is necessary for the veterinary surgeon to be informed of its nature; the method of cure when necessary, as it is connected with the treatment of wounded arteries, or when they may be divided in performing operations.

The true aneurism is an enlargement or dilatation of the coats of an artery, without a breach or effusion of blood; and from cases that have occurred, in dissecting horses, there is every reason to say, that they take place more frequently in the larger internal arteries in horses than is imagined, and that sudden death is sometimes occasioned by their bursting. It is found that aneurisms happen most frequently in the human body, where the blood strikes

with the greatest force upon the sides of an artery where there is a curve or bend in it.

A spurious aneurism is frequently the effect of a small puncture or wound in the coats of the artery, penetrating into its cavity, by which means in every pulsation some blood is thrown out and extravasated into the neighbouring cellular substance and interstices of the parts; which being accumulated, and its more liquid parts being dissipated, it coagulates and forms a tumor above the wounded part of the artery, without any pulsation, or at most with a very obscure one.

From the account we have given of internal aneurisms, no hopes of a remedy can be entertained. The spurious kind happening in the extremities, may in most cases

cases admit of a remedy, by treating them as a recent wounded artery, which is to separate the fleshy substance about the artery, if it can be done with safety, and tying up both its mouths, by passing a long blunt crooked needle (with an eye in the point, armed with a strong wax thread,) under the artery at each side of the wound, and secure it properly by the legature. This operation is called the operation for an aneurism; but if the mouths of the divided artery should retract so far within the fleshy parts as not to be got hold of, in that case the whole of the surrounding substance may be included in the ligatures. It is of great importance that the veterinary practitioner should be well acquainted with the course of the large arteries, by which he may avoid either dividing or wounding them in performing operations. Wounds in arteries are more or less dangerous to life, in proportion

portion to their size, nearness to, or distance from the heart, and the great hemorrhage or loss of blood that may follow.

Offification, in the coats of the arteries of horses, seldom takes place but in those who arrive at a greater age than common.

Varix, in the veins, like aneurism just described, are an enlargement or dilatation of the coats of the veins, forming a longish tumor, or swelling, considerably larger than the bulk of the other part of the vein. This takes place in horses for the most part in the superficial vein which passes over the inside of the hock joint, forming a very visible swelling, and is called a blood spavin. When it takes place suddenly, it is attended with pain, and of course lameness, and, in moving, with a considerable stiffness in that limb. The cure ought at first to be attempted by astringents and compression of the
parts

parts by bandage, but if that should not succeed, it must be treated in the same manner as an aneurism described above, treating it afterwards as a common wound.

Varix has always been considered as proceeding from an over distention of the parts, or of some accident; but, on more accurate investigation, it has been found to proceed from compression, of some kind or other, obstructing the progress of the blood through the compressed vein.

C H A P. V.

OF RESPIRATION OR BREATHING.

WE have seen what life is, and wherein it consists, particularly in the action of the heart, and the motion of the blood caused by that action.

We have described both these, and have traced the blood in its course through the auricles and ventricles of the heart into the aorta and its branches; and from thence
through

through the veins back again to the heart.

But though this motion of the blood constitutes life, insomuch that wherever that is, there we pronounce life to be ; yet, as we observed in the beginning, any degree of life would quickly be at an end, if there was no other animal function added to it. And the function most immediately connected with that life, and most requisite to support its duration, we have shown to be respiration. This we are at present to take into consideration, and explain its nature, instruments, and effects.

Respiration is the alternate drawing and expelling air into and out of the lungs, whereby their cavity and volume, and that of the thorax or chest in which they are placed,

placed, is alternately enlarged and diminished.

That the nature and circumstances of this function may be the more clearly understood, it will be necessary to premise a brief account of the structure, first of the thorax, and next of the lungs.

The thorax is a large cavity, somewhat in the shape of a cone, reaching from the under part of the neck to the abdomen or lower belly, from which it is divided by the diaphragm. The bones that form and guard its cavity are the vertebrae of the back, the ribs on each side, and the sternum or breast bone; as the diaphragm, which parts it from the abdomen is not placed in an erect or perpendicular position to the trunk of the body, but slanting downwards and forwards. The cavity of the thorax is considerably shorter below than above. The ribs,

ribs, which form and guard the greatest part of the cavity of the thorax, are all articulated with their respective vertebrae, in such a manner as to admit of a motion forwards and backwards in brutes, but upwards and downwards in man, with some degree of rotation at their insertion, like the motion of the ball and socket. They are likewise all connected and articulated with the sternum or breast bone, by the intervention of cartilages, so as to admit of the same motion forwards and backwards.

The ribs are all more or less arched, being convex outwardly and concave inwardly, towards the cavity of the thorax. The ribs, as they go backwards, grow each gradually longer than those above to the seventh; and they all become more oblique in their direction towards the sternum. From which structure it follows, that if the ribs are all moved forwards round their ar-

ticulation with the vertebrae, their arched middle parts will be pushed outwards and laterally ; and, consequently, the cavity of the thorax will be widened and enlarged.

There is a set of muscles that perform this office, called the intercostals, both external and internal. They run obliquely from the edges of every rib, to those of the ribs nearest each other, for the whole length of the ribs ; and from the highest rib to the lowest. The fibres of the external have a direction contrary to that of the internal, by which contrivance their joint action becomes the more steady, the ribs being pulled in the diagonal of these two directions ; that is, neither forwards nor backwards, but directly towards one another.

When these muscles act, they endeavour, as we have said, to pull the ribs nearer one another ;

another ; but as the ribs are gradually the more moveable the lower they are, the first and uppermost having scarce any motion at all, by their joint action the whole system of the ribs (except the twelfth or lowermost, which is fastened to the diaphragm, and therefore follows its motion) is lifted forwards, and the cavity of the thorax widened and enlarged in the manner we have said.

This widening of the thorax any one may experience in his own body. Apply a fillet or garter round the broadest part of the chest, and immediately after expiration observe the exact measure ; then draw in the breath strongly, and it will be found that a longer line will be required to go round than before, by an inch or more in a middle size.

There

There is still another contrivance that serves to enlarge the cavity of the thorax, viz. the diaphragm or midriff. This muscle, which, as we have said, divides the thorax from the abdomen, like to a curtain, arises from the sternum before, from the ribs on each side, and behind, from the last vertebra of the thorax and the first one or two of the loins. Its fibres run fleshy from the circumference towards the centre some way, and then become tendinous. It hath, besides muscular appendices, one on each side, arising from the third vertebra of the loins; which proceed upwards fleshy, and are inserted in the tendinous part. The whole diaphragm, as was observed before, does not divide the thorax from the abdomen in a perpendicular line, but inclines in a slanting direction from the vertebrae of the back, forward towards the sternum, by which means the upper part of the thorax is considerably longer

longer than its lower part at the sternum. It is not plain, but convex towards the thorax, and concave towards the abdomen; insomuch that its middle or centre rises always higher in the thorax, than its origin at the sternum.

When it acts, the fleshy fibres shortening, pull the tendinous centre towards their origin, thereby rendering it plainer and less convex, and so lengthens the cavity of the thorax.

Here then is a double way of enlarging the capacity of the thorax; by the intercostal muscles raising the ribs it is made wider; and by the action of the diaphragm it is rendered longer, or deeper. Let us proceed to shew for what purposes this mechanism is intended. But, before this can
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be properly understood, we must first explain the structure of the lungs.

The lungs are situated in the cavity of the thorax. They are divided into two large parts called lobes; the one on the right; the other on the left side, which are separated from one another by a production of the pleura (that membrane which lines the whole cavity of the thorax.) This production, called mediastinum, divides the thorax lengthways into two equal separate cavities, that have no communication with one another; insomuch that if blood, or pus, is collected or water is poured into one of these, it can find no entrance into the other. But as the heart and pericardium, with the great vessels that open into it, and issue from it, are contained in the left division, upon that account the left lobe of the lungs is considerably less than the right.

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The external air finds admission into the lungs by the wind-pipe, called trachea or aspera arteria, the head or upper part of which, called larynx, opens into the mouth at the throat; its opening is called glottis. It is composed of different cartilages firmly fastened together, which are furnished with proper muscles, chiefly subservient to the purposes of the voice, and likewise instrumental in swallowing.

The aspera arteria or trachea is continued from the larynx, and proceeds down towards the lungs. It is a firm tube, made up of cartilaginous rings, joined together by muscular fibres. These rings are incomplete; probably that it may yield somewhat to the aliments distending the oesophagus in swallowing, that lying immediately behind the larynx, or nearly so. The whole is covered on the outside with a cellular

lular membrane ; and lined on the inside with a smooth polished one.

It descends entire into the thorax, as far as nigh the basis of the heart ; and there divides into two great branches, the one right, the other left ; which again are divided and subdivided into lesser and lesser ramifications ; and so distributed through all the substance of the lungs, terminating at length in small membranous dilatable cells or vesicles.

The pulmonary artery, which we have had frequent occasion of mentioning before arises from the right ventricle of the heart, proceeds towards the lungs, and, being divided and subdivided into branches gradually smaller and smaller, is distributed all over the substance of the lungs. Its smallest capillary branches become the origins of
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the pulmonary veins, which likewise run all over the lungs, accompanying their corresponding arteries ; and at length form the great pulmonary vein ; which opens into the left sinus and auricle of the heart.

But besides these branches of the pulmonary artery that carry red blood, and transmit it to the veins to be sent back to the heart, it likewise sends off extremely small lateral serous vessels, which open into the inside of the bronchia and vesicles all along ; and furnish them with a moist extreme subtle fluid, or rather vapour, which bedews their internal surfaces, hinders them from growing together, and preserves them supple and dilatable. This appears from warm water, or even a fine injection's passing from the pulmonary artery into the cavities of the bronchia. Kaw mentions

his having often repeated this experiment with success.

The lungs, besides their external membrane, and cellular texture, are a congeries of air vessels and vessels which carry blood or juices derived from blood; and these two kinds of canals are so uniformly dispersed through the lungs, that in every physical point there are branches of both all over.

Before we can explain the action of respiration, we shall give a short account of that fluid, which is alternately drawn into and expelled out of the lungs, and explain some of its properties.

In the definitions we have mentioned some of the general properties of atmospheric

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ric air, that it is a transparent, elastic, ponderous, and compressible fluid.

It is elastic, that is, when compressed it endeavours to restore itself with a force proportionable, and nearly equal to the pressure. From this property it is susceptible of tremulous motions or vibrations; and is the medium of sound.

It is heavy in a certain degree, being in proportion to water as 850 to 1, at a medium, for the weight of air varies, as appears from the phaenomena of the barometer; so that if a pint of water weighs a pound, a pint of air will weigh something more than nine grains.

As it is an heavy fluid, it hath that property common to all such fluids, that its parts are pressed every way by the weight of the column above; and the force of that pressure

pressure is in some measure in proportion to the altitude of the column. Hence it endeavours to recede from that pressure, and actually does recede, if there is a vacuity to run into.

It is compressible by a suitable force into a lesser space than it possesses in the atmosphere.

And therefore near the surface of the earth it is denser and heavier than higher up, as the column of air pressing there is higher. In this respect it is quite contrary to water, which is not compressible by any weight or force, as far as experiments have shewn. Water at the bottom of the sea is no denser than on the surface.

Air hath its spring or elasticity increased by heat, and diminished by cold, and therefore

fore heat uniformly rarefies it, as cold condenses it ; and this property seems to be unlimited.

If the pressure of the atmosphere is taken off a portion of air, it expands itself into a larger space, and that property, likewise, seems to be unlimited ; a cubic inch of air, when freed from the pressure of the atmosphere, will uniformly fill an indefinite space.

Its elementary parts, when separated from one another, and intimately mixed with other bodies, whether fluid or solid, exert no elasticity, unless the atmosphere is removed, or violent heat applied : or unless fermentation, putrefaction, or effervescence is produced, which sets the aerial particles at liberty. But when joined together, by any of these means, they recover that property.

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These are the chief properties of air, considered as pure and unmixed with any thing foreign to its nature. But our air, the atmosphere we breathe in, is a chaos of every thing that is volatile, and light enough to be suspended in it, and every thing that can be dissolved in it ; and particularly, it is always more or less fraught with watery particles, as water exposed to the air hath always more or less air in it, which the air pump shews. But still its fundamental qualities remain, its fluidity, weight, and elasticity or spring ; though the two latter are variable in their degrees, according to the various causes that act upon it.

Let us then suppose the cavity of the thorax to be enlarged by the action of the intercostal muscles, which widen it by pulling the ribs forwards, and by the diaphragm, which, becoming plainer, and pressing back
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the viscera of the abdomen, renders its cavity longer and deeper ; in this case room will be made for air to be pressed into the larynx, trachea, and lungs by the atmosphere, to fill up the new space with air of the same density with the ambient air. Of course it will rush in with so much the greater force, and in so much the greater quantity, the more the thorax is enlarged. This air rushing in will distend the membranous vesicles of the lungs, and fill them in such a manner as to keep the external surface of the lungs always contiguous to the pleura ; for there is no air between the pleura and the external membrane of the lungs ; if there were, the lungs could not play, as the air so included would counterbalance the external pressure of the atmosphere.

By this expansion of the vesicles of the
lungs,

lungs, the capillary terminations of the pulmonary artery, and the beginnings of the pulmonary vein; which run along these vesicles all over the substance of the lungs, are unfolded and streightened, which lessens resistance to the right ventricle of the heart, in propelling the blood through them into the pulmonary vein and left auricle of the heart.

At the same time the air drawn into the lungs is considerably colder than the blood in any part of the body, and particularly that of the lungs, where its velocity is very great, as also the friction; and in cases of laborious and violent exercise, it prevents the heat there from being excessive. But beside this refreshing coolness of the external air communicated to the lungs; it would appear that it answers some other
very

very important purposes to animal life. As no animal that is furnished with lungs, as those of the more perfect kind are, can live any space of time worth mentioning, without constant supplies from this vital fluid, which seems, by an instantaneous process performed in the lungs, to give off something salutary to life, and carry out of them something noxious, as the air thrown out from the lungs is rendered unfit for being again inspired, either by the same animal or by another; but the qualities of this vital principle we shall have occasion to speak of more fully when we come to treat of the properties of the blood.

These are some of the effects of inspiration, or drawing air into the lungs; let us now consider expiration, or the expulsion of air out of them.

When there is as much air taken in as the well being of the animal requires, the action of the muscles that widen the thorax is discontinued; the cartilages of the ribs, which in inspiration were agitated, by being pulled forwards, are now at liberty to restore themselves by their elasticity, and pull back the ribs.

At the same time the muscular fibres of the bronchia, that connect the cartilaginous rings, being now at freedom to act; by their action they pull the rings closer to one another, and thereby diminish the volume of the lungs all over.

Besides, in a natural state as has been already observed, there never is, nor can be, any elastic air between the outer surface of the lungs and the pleura, as hath appeared

appeared from undoubted experiments; hence the pressure of the atmosphere will co-operate with, and assist in thrusting down, the ribs.

But this is not all. For the muscles of the abdomen, all more or less, concur towards expiration, in diminishing the cavity of the abdomen, and pressing its viscera upwards against the diaphragm, by pushing it higher up into the thorax, and shortening its cavity.

The immediate effect of expiration is by diminishing the volume of the lungs to force the blood through the capillary terminations of the pulmonary artery, and the venous system corresponding with them, into the left auricle of the heart.

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The current of the blood through the pulmonary artery, and the femilunar valves at its mouth, hinder it from being pressed back into the right ventricle; and determine its progress entirely towards the left auricle.

Hence therefore the alternate distention and collapsing of the lungs becomes necessary to expedite, and even to effect, the circulation of the blood through them.

Were it not for this alternate change of the lungs, the circulation of the blood in the human body, and all other animals that have lungs, and two ventricles to their hearts, could not be carried on.

For, if the lungs continued in a state of distention by the air's being pent up within them, that air would be heated and rarified;

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its spring would be increased to such a degree, that the small blood vessels, running along the membranous and vesicular texture in the lungs, would be so compressed by it, as to stop all passages through them; and life, which consists in the circulation of the blood, would quickly be at an end.

On the other hand, if the lungs remained in a collapsed state, without being distended by air inspired, the small vessels would be folded together like threads in a clue; so that the right ventricle could not force the blood through them so expeditiously as that one pulse should regularly succeed another. The blood would quickly stagnate in the right sinus, auricle and ventricle, and death ensue.

Therefore as soon as there is by inspiration air enough admitted to answer the purpose of
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the trajection of the blood through the lungs; the animal for self-preservation, and to avoid uneasiness, drops inspiratory efforts, and commences those of expiration; and when it hath performed them in a proper degree, it again inspires and expires and this action continues while life remains.

One of the general uses of respiration is to effect the trajection of the blood through the lungs, and so complete the circulation, in which life consists. For without it, as we have shewn, this trajection could not take place in animals that have lungs, after they have breathed and used them some little time. Foetuses, that are pent up within the uterus, live under another kind of circulation, which we shall explain in its place.

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By this trajection of the blood through the minute vessels of the lungs, with such velocity as it must there have, sanguification is performed, the blood is comminuted and divided ; its globules are compacted, condensed, and rounded ; and so rendered the fitter for flowing commodiously through the other canals of the body, for yielding the necessary secretions, and answering the numerous purposes of the animal economy.

Another very important use of respiration is, that by inspiring of air into the lungs, heat is generated in the animal body, the redness of the blood is brought on ; the chyle before it is mixed with the blood, is white, and the lymph is pellucid ; but the mass of blood after it hath past the lungs is red. It would seem, from Sir Isaac Newton's discoveries concerning colours, that the change of colour here is owing to the
increase

increase of density. No doubt, besides respiration, the circulation of the blood through the minute extremities of the arteries contributes somewhat towards this increase, and therefore enhances the red colour of the blood.

To bring about these ends, all the blood of the body is propelled through the lungs; which cannot be truly said of any other viscus of the body.

And in the same time that any quantity of blood hath circulated from the mouth of the aorta through its capillary branches, in the extremities, &c. and returned to the heart, an equal quantity of blood hath passed through the lungs.

Besides the general and chief uses of respiration already mentioned, nature always
brings

brings about the most numerous and most important purposes by the fewest and most simple means possible, that function hath several other uses which are of the greatest consequence in the animal oeconomy.

The secondary uses of respiration and expiration are many ; by the latter we find that it exhales, as an emunctory, parts redundant or even noxious from the blood, which would suffocate if they remained ; hence the breath of many people, shut up in a close place, impregnates the air with a suffocating quality. On the other hand, it absorbs from the air that vital oxygenous principle so necessary to life. It is by this volume of air, taken into the lungs, that the abdomen and all its viscera are continually compressed and agitated by it, likewise the stomach, intestines, receptacle of the chyle, bladder, rectum, and even the womb, discharge their contents ; by

its action and alternate compressure on the stomach, digestion is forwarded and the blood urged through the sluggish vessels of the liver, spleen, and mesentery. It excites a kind of flux and reflux in the blood, by which it is alternately pressed towards the extremities of the veins, and afterwards propelled towards the heart with an accelerated velocity. Inspiration serves to convey odours along with the air to the organs of smelling; by it likewise, animals distinguish their proper food, in selecting what is salutary, and rejecting what is noxious; by it likewise, sucking, so necessary to the new born animal, is performed.

Respiration forms the voice in every class of animals, and is of a particular kind or modulation, peculiar to each species, depending upon the difference of the larynx and glottis. This is demonstrated from the
narrow

narrow glottis of birds, and the large broad glottis in hoarse animals and such as bellow or bleat. Every species have their own peculiar sound or tone of voice. Thus the horse neighs; the bull bellows; the sheep bleats; and the dog barks; man only can articulate by voice and speech, by drawing in and throwing air out of the glottis, formed and modified by the lips, tongue, teeth, and throat, in such a manner as to produce an infinite variety of distinct sounds, by which he is enabled to communicate his thoughts to another, and to represent these sounds by letters and words.

Before we dismiss this function, let us observe that we may distinguish two kinds of respiration; the one easy and equal, which goes on without our attention, and while we are asleep; this may be called vital or involuntary respiration; and the other

ther the voluntary kind, which we can influence by the will; and either excite or stop, and make quicker or slower, fuller or smaller inspirations and expirations.

The former seems to be influenced chiefly by the diaphragm, and intercostal muscles, and by a gentle proportionable action of the abdominal muscles in expiration, co-operating with the elasticity of the cartilages of the ribs, and the muscular fibres that fasten together the cartilaginous rings of the trachea and its divisions, called bronchia.

In great, full, and laborious respiration, there are several other muscles besides those already mentioned, that are called into action, not necessary at present to particularize.

Lastly, we may remark that there is a certain proportion of the frequency of acts
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of respiration, to the pulse, there being in a common natural way about three or four pulses for one respiration. Hence respiration is quickened, as the pulse is quickened, either by exercise or in fevers. And therefore respiration ought to be diligently observed in acute distempers.

C H A P.

C H A P. VI.

*OF VOICE, AND SOME DISEASES OF THE THORAX
AND LUNGS.*

IN our last chapter, we have explained respiration, and shown that in an animal that is furnished with lungs, and hath used them even a very moderate time, the blood cannot be propelled by the heart through the lungs, without its assistance. That by inspiration the blood in its passage through the lungs, hath its particles divided
and

and comminuted ; made denser and more compact ; rounded, and rendered red ; and in general better fitted to pass through the various sizes of canals in the body, and furnish matters for the various secretions. That the heat of the animal body is in a great measure generated from the air inspired into the lungs, by which the blood is oxygenated ; and, lastly, that besides these principal uses of respiration, it likewise serves to bring about several other purposes, which are indispensibly requisite in the animal oeconomy. We shall now briefly explain some of these, that have the most immediate connection with respiration : and afterwards touch upon some of the principal distempers that have their seats in the lungs and thorax.

We shall begin with the voice, which in brutes is inarticulate, or a sound produced by throwing out air with a certain
force

force or velocity through the glottis, or aperture of the larynx, so as to make the cartilages, of which the larynx is composed, to tremble and vibrate, and communicate the like tremulous motion to the contiguous air.

Coughing is produced by repeated quick inspirations, each of which is succeeded by as quick, forcible, hard expirations, caused by violent strokes of the abdominal muscles determined upon the lungs. It is created by whatever irritates the pulmonic system, from the head of the larynx to the bottom of the lungs. Its effect, as a natural action, is to throw off as it were, and clear the inside of the bronchiae, by the violent impulse of air through them, and shake off the irritating cause.

Sternutation,

Sternutation, sneezing, or snorting, is produced by first drawing in a large quantity of air into the lungs, succeeded by a violent convulsive action of all those muscles together, that can in any degree contribute towards expiration ; by which means the air drawn in immediately before in large quantity is driven with a forcible explosion through the passage of the nose. Its cause proceeds from whatever irritates the olfactory nerves spread upon the Schneiderian or pituitary membrane ; its use is to shake and throw off the irritating cause, as wind blows off dust.

We now proceed, according to the plan we proposed, to give an account of some of the principal distempers that affect the lungs and aspera arteria ; and thereby exemplify the usefulness of the knowledge of the animal oeconomy in the rational practice of physic.

We have already mentioned and explained coughing as a natural action, we shall now consider it as a morbid symptom.

Coughing, as we have said, is an effort of nature to shake off something that is troublesome to the pulmonic system in a healthy state. Though this effort tends in its own nature to a salutary purpose, yet when it tends to a morbid or diseased appearance, no time is to be lost in using the most effectual means of removing it, as we shall see hereafter the danger of trifling in such cases.

The most frequent cause of coughing is what is commonly called catching of cold, or a catarrh. The seat of this disease is in the pituitary or the Schneiderian membrane, so called from Schneider, a learned German physician, who first considered it at large, and its diseases. This membrane lines the cavity of
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the nose, the palate and throat; passes into the cavity of the larynx and aspera arteria, and lines the inside of the whole system of air vessels in the lungs; and in like manner the inside of the oesophagus, stomach, and intestinal tube. Its surface hath, (besides visible mucous, excretory ducts, scattered up and down) small evanescent serous arteries opening upon it, which convey a warm watery moisture, which in health is in the form of a vapour, and keeps it moist and slippery, and hinders its contiguous portions from growing together; and as this vapour is liable to be accumulated, there are in the same surface absorbent venous vessels to take it up. But when by the cold air the absorbent vessels are constricted, and the vaporous fluid condensed, the exhaling arterial canals continuing to pour out their liquids, instead of a warm vapour, that creates no irritation upon the parts, a sensible salt ichorous lymph is discharged from

from the various affected parts of the membrane, which irritates wherever it trickles along ; if it falls upon the nostrils, it creates sneezing, or snorting ; and if it fall upon any portion of the pulmonic system, from the head of the larynx to the bottom of the lungs, it creates coughing ; and, obstinately continuing, too often lays the foundation of a phthisis pulmonalis.

The cure of this cough, while it is recent, and the lungs are yet entire and unimpaired, besides keeping warm, rest of body, low soft diet, with plenty of diluting drink, made milk warm, to encourage a diaphoresis, it requires balsamic, smooth, demulcent medicines, and a prudent use of opiates ; by the application of which, after the distemper hath in some measure had its course, the obstructions in the membrane being opened, the catarrh or defluxion is drained

drained up; and the irritating cause removed.

Another very common cause of coughing is an accumulation of tough phlegm in the bronchiae. As we have observed, there is naturally a warm moist vapour poured by small serous arteries into the cavities of the bronchiae; if this is poured out in too great a quantity, by remaining there, it becomes thickened, the thinner and aqueous part either flying off into the air, or being reabsorbed, the remainder becomes viscid, clogs up the passage, irritates the lungs, and excites a cough, which is an effort to get rid of it. This cough is cured or relieved by such medicines as attenuate the impacted phlegm, lubricate the passages, temper acrimony, and leave a balsamic astringent effect, preventing the accumulation of too great a quantity of phlegm for the future;

and

and such medicines as possess one or more of these powers in a remarkable degree are called pectorals.

Some pectorals have chiefly a faculty of tempering acrimony, and lubricating the passages, as spermaceti; all expressed oils, and oily substances. Others chiefly attenuate, dissolve, and deterge phlegm; as liquorice and other pectoral plants, sugar, honey, vinegar, gum ammoniac, &c. others are besides astringent and balsamic; as all the terebinthinate class, and their preparations.

Opiates become pectorals chiefly, and almost solely, by taking off the sense of irritation for a short time, but without carrying off the irritating cause; however they are of great use, by keeping down the violence
of

of cough, and procuring a truce, until the cause be removed by other effectual methods.

Asthma is a difficulty of breathing, with wheezing, returning by fits, and often lasting long, and threatening suffocation. In horses it is called broken wind, requiring a double effort or two expirations to empty the lungs for one inspiration, attended with violent heaving at the flanks.

Authors have distinguished asthma into the nervous and humoral, to denote that every species of asthma leans to one of these two kinds, as they are seldom or never to be met with pure and unmixed.

The humoral kind, is that which is occasioned by an accumulation of phlegm or mucus in the small and deep bronchiae; which, when it is in a great quantity, and occupies a large portion of them, hinders the air from expanding the lungs sufficiently,

sufficiently, and expediting the passage of the blood through them.

The nervous or dry cough, sometimes termed convulsive asthma, is created by a convulsive constriction of the muscular fibres that connect the cartilaginous rings of the bronchiae, which makes the lungs to resist their being expanded by the air. But, at the same time, a spasmodic disposition in the muscles of the abdomen, overpowering the diaphragm, may be an accessory, or perhaps in some cases a principal, cause of this sort of asthma.

But if the asthma is of any remarkable violence, or continuance, it is seldom or never without a mixture of both natures. An asthma from a nervous cause, of any consequence, can scarce fail of accumulating more phlegm than there should be, by pen-
ning

ning it up, and hindering the salutary efforts of the lungs in order to throw it off. And where there is a great quantity of phlegm, so as chiefly to produce real asthmatic fits, there appears always, as far as we have observed, signs of a spasmodic disposition, and constriction of the lungs.

In the humoral kind, besides a prudent measure of proper evacuation, the most effectual and attenuating pectorals are indicated. Pectoral vegetables, the spirit of Mindererus, gum ammoniacum, squills, and, in violent cases, antimonials and mercurials are most to be depended upon.

In the nervous asthma, cephalic medicines are required ; but not without the mixture of attenuants. The fetid gums act here in a double capacity. Blisters pretty extensively

laid on the sides operate most effectually and are very proper in all obstinate coughs.

Haemoptoe, is a throwing up of blood ; if it comes not from the mouth or throat, but is brought up from the breast, with a kind of short cough, in a remarkable quantity, and frothy appearance, proceeds from a breach of some of the branches of the pulmonary artery.

A breach of vessels in the lungs is of more dangerous consequence than in many other parts of the body, because of their incessant motion, the velocity of the blood passing through them, and the sponginess of their texture. Upon these accounts it is apt to degenerate into an ulcer. Great care therefore is to be taken to treat it properly when it first appears, that the breach may be healed as soon as possible. Bleeding,
gentle

gentle cooling physic, cooling temperate diet, rest of body, with opiates, and such balsamic pectorals as can best keep the cough under, are here requisite. If the haemorrhage is large, astringents and even stiptics are necessary, of which alum is none of the least effectual.

A *vomica pulmonum*, is a tumor bred in the cellular texture of the lungs; which contains sometimes pus, sometimes a viscid liquor different from pus, and sometimes a clear pellucid lymph. This last sort is called *hydatid*. The *vomica* grows larger and larger by degrees, and creates more and more of irritation, by pressing the contiguous air vessels against one another, which excites an almost perpetual cough, and lays the foundation of a *phythisis pulmonalis*.

If

If it bursts, it becomes an open ulcer. And if the matter is kindly, the habit of body good, the tumor circumscribed, and its coats but thin, it sometimes cleanses, and heals speedily ; but too often the ulcer continues to increase and spread ; the patient coughs almost incessantly, and throws up much fetid stuff, both by the mouth and nostrils, the lungs waste, and are consumed, attended with an hectic fever.

I have known a broken rib, in consequence of the horse falling on a loose stone, occasion a vomica in the lungs ; much purulent matter was thrown up by the mouth and nose, but the real cause of the disorder was not discovered till on dissection, the rib was found bent inwards, had tore the lungs, inflammation followed, and of course suppuration, which suffocated the patient.

A vomica in the lungs from catarrh, &c. is for the most part incurable, but in the case of a broken rib as above, when all the circumstances are early known, something may be done by way of prevention, to preserve the life of the animal, and render him afterwards useful ; by observing the same treatment as in inflammation of the lungs, and afterwards administering such balsamic pectoral medicines as are safely detergent. These with a prudent use of opiates, proper diet, and rest of body, are the chief means to effect a cure, where it can be effected.

An ulcer of the lungs, as hath been hinted, may proceed from a throwing up of blood, without a previous tumor, and goes on pretty much in the same course we have been now describing ; requiring the same method of cure and regimen.

Inflammation

Inflammation of the lungs.—This is one of the most frequent and most dangerous diseases to which our patients are liable, and requires the greatest prudence, skill, and attention in the veterinary practitioner, to regulate his conduct in the management of it, so as to preserve the life of his patient, or the future soundness of this organ. As all inflammatory disorders in horses are exceedingly rapid in their progress, and if not properly managed soon terminate in gangrene and mortification, of course the loss of the patient in the short space of two or three days.

We have already explained the different functions of this organ, its great vascularity, the great mass of blood it must of necessity contain, at all times, even in health; from which we may infer, that any undue accumulation of blood in this viscus, any hindrance or obstruction to its free circulation,
or

or any impediment to its natural functions, will derange the whole circulating system. The right ventricle of the heart will be surcharged with blood, which it cannot propel through the lungs, while at the same time the left ventricle cannot receive a sufficient quantity of blood from the lungs to supply its contracting and propelling through the body ; hence a small contracted and oppressed pulse ; the air is prevented from passing fully in and out of the lungs, and hence likewise a laborious breathing.

Symptoms of this disorder are numerous, as in fever of the symptomatic kind, a small and frequent pulse, laborious breathing with wide and extended nostrils, heaving at the flanks, mouth hot and dry ; hot breath, extremities cold, the tongue white, membrane on the inside of the nose red, eyes red and heavy, veins about the head turged and full, the patient disposed to
cough,

cough, but unable to make the effort from pain, the horse stands straddling and extended on his legs, panting for breath, seldom or never lies down; dullness and heaviness about the head; cold ears; the natural secretions of dung and urine generally not much affected, but in some cases a disposition to costiveness. As the disorder proceeds, a gleeing from the nostrils of a greenish slimy mucus, with a foetid stinking breath, the air around him becomes tainted with a cadaverous smell. Unable any longer to struggle with the disorder, he falls suddenly down and expires. On dissecting the bodies of such patients as have died of this disorder, the lungs are generally found turgid and full of blood, of a black appearance, and in a gangrenous state; the texture of this organ being destroyed, it cannot bear the touch, but appears as if it were rotten; hence this disorder has among farriers and others got the name of the *rot*; and

and has been as erroneously applied to similar diseases of other domestic animals.

The cause of this disease is generally too sudden exposure of the body to cold, in any shape, after being overheated, either from exercise or from the habit of being constantly covered with body cloaths in too warm a stable; for horses seldom suffer any injury from cold when their bodies are exposed to it in a temperate state; this we know from experience, in a variety of cases, but more especially when horses are turned out to graze at all seasons.

The method or indications of cure to be observed, on the very first attack of this disorder, for not one moment of time is to be lost, are a strict attention to the antiphlogistic regimen, in lessening the distention of the blood vessels in the lungs, by plentiful bleeding, according to the age, strength,

and size of the patient. If the pulse rises after the first bleeding, it ought to be repeated at intervals afterwards, but to a less extent, always having regard to the age, size, and strength of the patient, till the violence of the symptoms abate. Emollient glysters are of great use; together with strong blisters, or other irritating liquid mixtures pretty extensively applied to the breast and sides of the thorax or chest. When the violence of the symptoms abate, issues or rowels may be put under the breast, on the most depending parts, besmeared with stimulating ointment. But no liquid drenches, or perhaps no medicine whatever, should be attempted to be given by the mouth during the violence of this disorder, as the very attempt, and position to which the head must be raised, aggravates the disorder and endangers suffocation; instances of which have occurred too frequently, and hastened a fatal termination.

The

The patient ought to be kept cool both with respect to clothing and the heat of the stable. Thin water gruel for drink may be offered frequently, rather cool than otherwise, but no solid food whatever, till the violent symptoms are removed, when thin mashes are the most proper food for a few days. With respect to medicine, diuretics are here of great use, as this disease frequently terminates in a serous effusion of the watery parts of the blood, into the cavity of the thorax, and lays the foundation of a hydro-thorax or a dropsy in the cavity of the chest.

Pleurisy,—Is an inflammation of the pleura, or that membrane which lines the cavity of the thorax. Some Physiologists place the seat of this disease in the external membranous coat of the lungs. But the symptoms, which take place on the first
attack

attack of a pleurisy, differ very considerably from those that appear on inflammation of the lungs, both in man and in horses. The violent pains or stitches felt in the sides in the human patient, and the seeming acute pains affecting horses in the like disorder, and in the same place, seem to indicate, that the real seat of the disease is primarily in the pleura, although in its progress the lungs may likewise become affected.

On the first attack of the pleurisy, the horse appears rather lively; the pulse quick and hard; fever high; dry short tickling cough; breathing quick and short; great restlessness; seeming sharp pains in the sides, as the head is frequently turned to that which is affected; mouth dry; extremities hot; sometimes profuse thin sweat on the sides and temples; the horse lies frequently

quently down, but gets up instantly, not being able to breath in that posture ; paws the ground frequently with his fore-feet ; shifts from side to side of the stall ; the natural secretions of dung and urine free. In the course of a few hours (if not relieved,) the symptoms vary ; the restlessness goes off ; the fever increasing ; looks dull and heavy ; pulse throbbing and quick ; disposition to cough but unable ; panting and short stops in breathing, intermixed with groans ; extremities become cold ; damp clammy sweats ; inattention to what passes around ; straddling fixed posture till he drops down.

Upon dissecting horses that have died of a pleurisy, the intercostal muscles to a great extent have been found greatly affected and in a gangrenous state.

The

The cause of pleurisy generally proceeds from cold in any way applied to the body when in an overheated state, or too suddenly after it. And the disorders arising from catching cold in our patients are frequently far advanced before they attract notice, so as to admit of being checked in their first beginning.

The mode of cure in pleurisy ought to be the same as that formerly mentioned in the case of inflammation of the lungs. We have been the more minute in describing the symptoms of pleurisy to enable the young veterinarian to distinguish it from flatulent cholera, as in the latter complaint, some of the symptoms attendant on pleurisy are nearly similar. In the cholera, the horse paws the ground with his fore-feet, turns his head frequently towards his belly, as if to point out the seat of his complaint, at the
same

same time he frequently strikes his belly with his hind feet, but never attempts it in a pleurisy.

Hydrothorax, or dropsy in the breast,—Is, as we have observed, a serous effusion of the watery parts of the blood, collected into one or both sides of the cavity of the thorax, generally the consequence of a prior inflammation. As this disease is sometimes slow in its progress, gradually and imperceptibly encreasing for some time after the inflammation is gone, it may be said to be of the chronic kind, but with some exceptions.

The symptoms of this disease, when of some standing, beside all the attendants and morbid exterior appearances of ill health and want of appetite, are a great difficulty in breathing; a gleeing of slimy
mucus

mucus from one or both nostrils, a feeble irregular pulse, a sensible fluctuation of water in the chest, clamminess in the mouth, a spare discharge of urine, faeces black, soft, and slimy.

The cause of this disease, we have formerly observed, generally proceeds from a prior inflammation of some of the viscera in the thorax, and the succeeding debility that takes place afterwards. The exhaling vessels become relaxed; and, continue to pour out more fluids than the absorbents can take up; hence it is accumulated; and in the last stage of the disease, the lungs are literally drowned in water, of course the patient is suffocated. A number of cases of this kind occurred here among the cavalry horses in spring and summer 1799, which confirmed this observation on dissection.

We have thus given the history, the cause, the symptoms, and the appearances on dissection of a hydro-thorax, but any attempts towards a cure must be left to future experiments to ascertain its practicability in horses. Although the very nature of the case, together with the constant prone position of the body, in some degree points out the means that may be tried towards effecting a cure by a surgical operation called tapping, which is by perforating with a trochar between the ribs, on the thinnest and most depending part of the thorax, into its cavity, to discharge the contained water. To promote the success of this operation, we would recommend, before introducing the trochar, that the outward skin, after a perpendicular slit is made in it, be drawn well to one side, that upon retracting, it may serve to cover the perforation made by the trochar, in order to keep out as much as possible the ex-

ternal air from getting in between the pleura and the lungs. If the patient, after this operation, seems relieved, and likely to live, such medicines may then be administered as stimulate, and increase the powers of the absorbent vessels, and diminish the discharge of serum from the exhaling vessels.

Perhaps it might be adviseable, after placing the horse in a proper position on his back, to inject into the cavity of the thorax some gently stimulant or astringent liquor, such as lime water or brandy diluted with water, as is sometimes practised in such cases in the human subject.

CHAP.

C H A P. VII.

OF THE NATURE AND PROPERTIES OF THE BLOOD.

IN the preceding chapters, we have treated on the motion or circulation of the blood, and on respiration, without which, in a born animal, its passage through the lungs could not be effected; we shall now examine into and explain the nature and properties of the blood itself, out of which the various secretions are made, and the
various

various liquors answering the numerous purposes of the animal oeconomy are drawn.

Blood is the life of the animal. It is a fluid of a very particular nature, although at the same time there is no essential difference between the blood of a man and that of a brute; both possess the same properties of preserving life, and perhaps, by transfusion, the blood of one animal might serve to support life in another. However, there is one thing we are certain of, and which is, by drawing or taking away the blood we weaken the system. In general, the animal becomes faint; and, if pushed to the extreme, he dies from the loss of this vital fluid. The body then hastens to dissolution and separation of its parts.

We shall first consider the blood, as it appears to our unassisted senses, little, if at all,

all, changed by art ; next we shall deliver what is discovered concerning it by microscopes ; and, lastly, enumerate the different substances it yields when chemically analysed.

Blood, drawn from an animal in health, and received into a vessel, appears first an homogeneous fluid, uniformly red, and remarkably thicker than water.

While it remains warm, it throws off a vaporous steam, of a smell betwixt that of sweat and urine. This vapour, if collected in vessels for that purpose, when condensed by cooling, is found to be a limpid water, lightly impregnated with native animal oil and salt, inclining to an alkaline nature.

As the mass cools, it gradually thickens into a gelatinous consistence. Its surface,
exposed

exposed to the air, is of a lighter and more florid red than the substance within, and at the bottom, which is darker and inclining to black.

This coagulum, consisting of the whole of the blood except the vaporous steam we have mentioned, is found to be specifically heavier than water by about a twentieth part.

The longer this coagulum stands in a place no warmer than the surrounding air, the more it is changed. It parts with a thin yellowish fluid called its serum, (like the whey of milk separating from the curd, from which resemblance probably it hath its name.) This serum is heavier than water by more than a fortieth part.

The red part, called cruor or crassamentum, and sometimes, but improperly, its fibrous

brous part, as there are no fibres naturally in the blood, is considerably heavier than the serum, and therefore always settles at the bottom of the dish.

This red part, or crassamentum, if dried by art or chance, before it is melted down into serum, or dissipated by putrefaction, becomes hard and brittle, and entirely inflammable, and therefore oil is the chief part in its composition next to water.

The whole blood, both serum and crassamentum if it stands long enough in a warm place, putrifies and flies off in fetid effluvia, leaving very little faeces.

The serum, and likewise the crassamentum, by a degree of heat somewhat less than that of boiling water, is coagulated like the white of an egg. They are likewise
coagulated

coagulated by alcohol, and strong mineral acids.

They both leave a slight saltish taste upon the palate, shewing some kind of salt to be an ingredient in the composition of the blood.

These are the principal and most obvious phenomena of the blood, when examined by the unassisted senses, and with little or no artificial apparatus.

By the microscope more of its nature and constituent parts is discovered. From a small wound made by a sharp instrument in the finger, let a drop of blood be received into a small glass tube, and examined with a good microscope, it appears not homogeneous, but consisting of red globules swimming in a pellucid liquor.

By

Or by applying the microscope, while the blood is moving in the veins of a warm living animal, as in a chicken, or a cold animal, as in that of a frog, we perceive the red globules already mentioned following one another in alternate succession in the course of the circulation.

On analysing the blood, it is found to contain fire, air, water, earth, iron, and salt.

That the blood contains fire, in a latent state, is evident from its heat; which, in the human body, and that of some other animals, is from 90 to 100 degrees of Fahrenheit's thermometer. The principle of heat, in chemical language, is termed *caloric*. This principle the blood acquires from the air in its passage through the lungs, as will be more fully explained hereafter.

The blood likewise contains air in an unelastic state, and that in a very considerable quantity; this appears from its putrefaction, and from distillation.

Water forms another part of its composition; for, from fresh drawn blood distilled with a slow heat, a quantity of water, equal to 5 parts in 6, may be obtained.

The blood contains earth; this is demonstrated from nutrition and from chemical analysis; it appears that this earth lodges in the most fluid and oily parts of the blood.

The blood contains a ferruginous earth or iron, which is attracted by the loadstone, and is found upon calcination to be reducible into metal. It is from this iron that the blood is supposed to derive its red colour.

Salt

Salt in the blood we perceive from its taste.

From the preceding analysis of the blood, it evidently contains a great variety of particles, differing in bulk, weight, figure, and tenacity. Some watery, others inflammable, and most of them inclined to putrefaction, or to an alkaline nature; for the blood, as we have observed in a sound healthy state, is neither alkaline nor acid, but mild and gelatinous, and only saltish to the taste. Yet, in some diseases, it becomes acrid or sharp; and approaches near to a state of putrefaction; as in dropsy, where the waters have somewhat of an alkaline nature.

The greater the quantity of red globules in the blood, the stronger the animal is supposed to be. Hence strong animals have very red muscles, as they contain a greater quantity of red globules; weak muscles

muscles are pale as they are deprived of them. Butchers are sensible of this when they bleed their calves frequently before slaughtering, in order to take away the red globules from the muscular parts, that the flesh may appear white.

Whatever increases the rapidity of the circulation of the blood, whether from labour, violent exercise, fever, &c. will augment the cruor or crassamentum, together with the redness of the blood. On the other hand, inactivity and indolence, with low diet, the crassamentum will be proportionably lessened, and its serum and mucus increased. The crassamentum and gelatinous parts of the blood are greatest in the vigour of life, and diminish as age advances. From too severe and long continued exercises, great heat of the surrounding atmosphere, and from malignant disorders, the
cohesion

cohesion of the blood is dissolved, and it assumes an alkaline quality.

The red globules in the blood being confined within the first order of vessels prevents them from collapsing, and, from the force of the heart and density of their parts, they may add to its impetus, and to the motion of the lesser order of humours. It is likewise probable that the heart is more strongly irritated by the ponderous cruor of the blood; the globular figure of its parts, together with their density containing a quantity of iron and oil, makes them easily pervade the vessels, and perhaps tends to increase its power of retaining and keeping up that heat it had acquired in the lungs. We know that gentle exercise, in a healthy state, increases the circulation, and produces a gentle warmth over the body. A partial friction or rubbing, on any part of the
body,

body, by promoting the circulation in the part, increases the heat in them also.

When the red part or cruor of the blood is too much diminished by violent hemorrhagies, or too profuse and frequent bleedings, then follows a stagnation or a lessened motion of the humours in the smaller vessels, which disposes the body to œdema and to dropsy. By the same rule, a due proportion of cruor is necessary in the habit to generate and repair new blood; for, from the defect of these, it loses its red dense nature, and degenerates into a pale ferous or watery state. Hence it is evident, that health, in a complete or more perfect animal, cannot subsist without a dense and red blood; for, if its quantity should be too much diminished, it causes a stagnation of the juices in the smaller vessels, which is followed by a coldness and weakness in all parts of the body. Neither can life or health

health subsist without a sufficiency of the thinner juices intermixed with the red blood, as the cruor, when deprived of its watery parts, is disposed to congeal and obstruct the smaller passages of the vessels, and apt to engender too great a heat in the body.

But farther ; as it is the cruor that has the red colour peculiar to itself, and which it gives to the other parts of the blood ; if these parts were not kept fluid by the thinner juices, aided by the attrition of a vital circulation, or some similar concussion, they could not pass through the minute order of vessels, of course would occasion a stagnation ; hence may proceed tumours and local swellings, &c.

We have seen that blood out of the vessels runs into a confused, compact, tremulous

ous mafs, like to the liver. The fame effect will be produced by the addition of alcohol or ardent fpirits, by mineral acids, or by a heat of 212 degrees; (which is that of boiling water,) 98 of which is the blood heat in thofe animals that are ftrong and robuft.

Blood, whether in a fluid or a folid ftate, is fpecifically heavier than water, by about an 11th part; and, when freed from its watery part, it is wholly inflammable. In a mafs of healthy blood, an half, or perhaps more, confifts of red cruor; and in ftrong animals the ferum makes only about a third part, and is ftill more diminished in fevers, often to a fourth or a fifth of the mafs.

There is a difference both in colour and quality between the blood in the arteries, and the blood in the veins. The former being of a bright florid red. The latter of a dark
blackifh

blackish red. The arterial blood contains those vital qualities it had acquired in the lungs, and which it gives out in the course of the circulation, for the different purposes of the animal economy. The venal blood, on its return to the heart, takes up, and carries along with it, certain noxious qualities and impurities, which must be thrown out in the lungs, in order to fit it for a new circulation; it is from these noxious qualities that the air, which is expelled from the lungs in expiration, is rendered unfit for breathing.

In the coagulum of the blood, there is a thin fluid, called its lymph, which is thought to be a most essential part of the blood, as it has in the course of the circulation become completely animalized; it is supposed to form the new organization of parts that have been destroyed, as in

3 C wounds,

wounds, &c. likewise the callous of bones. It forms nutrition in all parts of the body. The thinner parts serve various purposes, as the solution of the aliments; the moistening of the external surface of the body, and surfaces of the internal cavities, in order to preserve the flexibility of the solids, and conduce to the functions of the nerves, the eyes, &c. the saline particles seem proper for dissolving the aliment, and stimulating the vessels. Moderate heat of the body contributes to the fluidity of the humours, and is not easily raised to that degree so as to coagulate them.

The quantity of blood contained in the body cannot be ascertained with any degree of certainty. But it is supposed that the weight of the mass of humours of various kinds, is greater than that of the solids; and if we may be allowed to form a judgement, from those profuse hemorrhagies
that

that have been sustained, without destroying life, both in men and in horses, together with experiments made on living animals, by drawing out all their blood, joined with the bulk of the arteries and veins; the mass of circulating humours in a man will be about 50 lib. of which the red blood may be calculated at 28 lib. Dr Bracken has calculated the quantity of blood in a horse to be about six times more than in a man; but he calculates the quantity of blood in the latter to be only about 25 lib. which will make the quantity of blood in a horse to be 150 lib. The quantities of blood that have been lost from hemorrhagies, &c. in the human subject, and where the patient has survived, is almost beyond belief. Haller mentions a case where 75 lib. was lost in the space of ten days; and, in another case, where 29 lib. was drawn away in four or five hours; and

and cafes have occurred in our practice where horfes have loft from 20 to 30 lib. in repeated bleedings, in the courfe of 12 hours, and that without injury, farther than a degree of weaknefs for a few weeks.

The feeming quantity of blood in individuals, both in men and in brutes, appears to vary in proportion, at different times, and varying in different parts of the body. Neither does it contain the fame or like proportions of thofe elements above mentioned; for an increafed celerity of the motion of the blood, whether by laborious exercifes, fever, &c. augments the craffamentum, together with its rednefs. The fame caufe likewise increafes the thicknefs of the ferum. From the above circumftances, together with the ftate of the folid fibres and veffels, the different temperaments of men and brutes are faid to be derived, and are diftinguifhed by the terms of plethoric or fanguine,

guine, which arises from abundance of the red globules in the blood; the phlegmatic temperament from a redundancy of the watery parts in it. The choleric disposition seems to arise from an acrid and alkaliescent disposition of the blood, as appears from those men and brutes who live much on flesh. The former being more passionate, and the latter more fierce than those who live on vegetable food. To the above may be added a kind of dull heavy sluggish temperament, almost bordering on stupidity, attended with great bodily strength. Inferences may likewise be drawn from the solids, where a great firmness of the parts joined with an exquisite sensibility, or what is called nervous irritability, disposes to the choleric habit; less irritability, with a moderate density, to a plethoric or sanguine habit, and a still lesser degree of density and irritability to that of the phlegmatic temperament. Thus far with respect to the

the constitutional temperaments ; and those who are much versant in horses, may easily draw a conclusion of their tempers and dispositions, from the countenance, eyes, and motion of their ears, for horses have their peculiarities of temper as well as men.

Dr William Harvey, who lived about the beginning of the 17th century, was the first who discovered, and, by experiment, proved the motion of the blood returning to the heart by the veins, in such a manner as to render the whole intelligible, and to leave no room to doubt its reality ; for before this discovery, the veins were supposed as well as the arteries to be concerned in distributing the blood throughout the body. The arteries being always observed to be empty or nearly so for a long time after death, they were supposed to contain air only ; and from this circumstance, they derive their name as air vessels.

As

As the blood nourishes the whole body, and tends to the support and growth of its parts, together with the various humours that are secreted from it, of course there must be a continual waste, not only of its constituent parts already mentioned, but likewise of its quantity; these must be constantly renewed; the latter, by the food or aliment that is taken into the stomach; the former, renovated by the action of the air, &c. on the blood, in its passing through the lungs.

In the preceding chapter on Respiration, we had occasion to make some remarks on the weight and elasticity of the air, and the manner of its acting on the lungs in the acts of respiration and expiration; we are now to make some farther observations on the properties of its other constituent parts,

parts, and their effects on the blood in its passage through that organ.

Atmospheric air, in which we breath, is composed of different parts,* some of which are distinguished by different properties, viz. that of supporting respiration in animals, and combustion or burning in inflammable bodies. In 100 parts of atmospheric air, there are about 27 parts only that will support respiration and combustion. These 27 parts are termed vital or oxygen, the other 73 parts that are incapable of supporting the

* These being aerial fluids are termed gasses, and, for the sake of brevity, are distinguished in the new Chemical Nomenclature by short terms which are expressive of their qualities, as oxygen, for vital air, azot, for mephitic air, carbon, for fixed air, hydrogen, the principle which generates water, and caloric the principle of heat.

the above processes are azot and carbon ; according as these predominate in the air, it may be reckoned more or less pure.

But to illustrate this farther. If an animal be confined by a proper apparatus to breathe in a certain portion of atmospheric air, it will breathe with freedom while the oxygen or vital portion of the air lasts ; but when that is consumed, its breathing will become more and more difficult, till at last it is suffocated. A body burned under the above restrictions absorbs the vital principle, or oxygen, from the air ; when that is consumed, the burning ceases ; the air that remains in both cases is unfit for respiration or combustion. Oxygen air, collected by itself, and a lighted taper put into it, burns with superior brilliancy. Animals breathe in it with freedom ; and are active and lively. Azot, collected by itself, and a lighted taper put into
3 D it,

it, is extinguished immediately: animals, on drawing it in to their lungs, die instantly.

It has been already observed, that the venal blood, on its return to the lungs, carries along with it some noxious qualities from the constitution that requires to be discharged from it in that organ by expiration. These noxious qualities meeting with the atmospheric air in the lungs, a chemical process instantly takes place, conducted by certain laws in nature, by which these noxious qualities are attracted and thrown out by expiration. This expired air is no longer capable of sustaining either life or flame; but, to be more particular in the above process, the oxygen combining within the lungs with a quantity of carbon derived from the venal blood in the pulmonary arteries, by which carbonic acid is formed, and which is expired together
with

with the azotic gas. During respiration a slow combustion takes place in the air-cells in the lungs, by which the dark venal blood is deprived of its superabundant carbon, and restored to the state of florid arterial blood, and rendered fit to circulate throughout the body. The hydrôgen, from the venal blood combining with the inspired oxygen, forms a part of that humid vapour which issues from the mouth and nostrils in breathing, which is more or less visible, according to the state of the atmosphere. By the union of the carbon with the oxygen, a quantity of caloric is disengaged from the latter, and heat is produced: And to this source, in a great measure, is to be attributed the origin and constant supply of animal heat.

From what has been said, it would appear, that the blood acquires, from the air, certain

certain properties, and, at the same time, possesses, in itself, certain other properties by which its first principles are, as it were, brought back from a venal to an arterial state, which renders it fit for the support of animal life. The alteration produced by the air on the blood in the lungs, from a venal to an arterial state, has long been suspected ; but by what means this change was effected was not known till the late improvements in chemistry opened a new field for experiments on atmospheric air, from which the above conclusions are formed ; for when blood is drawn from a vein, it is of a dark colour, but, on being exposed to the air, it soon loses that dark tint, and acquires a bright florid red colour ; and even when venal blood is put in a thin bladder, those parts of it, which are in contact with the external surface of the bladder nearest to the air, become of a brighter red colour than the internal parts of the same

same mass. From experiments made on live animals, it has been found, that the venal blood, before it enters the lungs, is black and impure ; but, as soon as it has passed through that organ, it is bright and florid.

It would appear, likewise, that some important change takes place in the lungs on the chyle, which may be supposed to be in a crude state, till it has undergone the action of that organ, as it has scarcely entered the subclavian vein, when it is conveyed with the blood to the heart, and from thence to the lungs, before it is distributed by the arteries throughout the system. The heart and the lungs, co-operating in the formation of the blood, and in converting the chyle into its substance, are in continual action. The heart is one of the muscles in the body that never tires, nor
grows

grows wearied from its long continued, constant, and uninterrupted violent motion. The will has no power nor controul over it either to encrease or diminish its action. And it never ceases its alternate contractions and dilatations from its first existence to the close of life.

The will has a small degree of controul over the action of the lungs. By suppressing this action, we can make longer and shorter, stronger and weaker, inspirations and expirations; but this power cannot be exercised for any length of time together, as the blood is continually flowing into the vessels of the lungs by the pulmonary artery, and cannot pass into the pulmonary veins while the lungs are kept distended with air. The blood accumulating occasions an uneasy sensation; to remove this, the natural functions of the lungs, on being restored,

restored, act by quick inspirations ; to make up the loss of time by which the blood receives the advantages above mentioned, the pulse and the breathing keep pace with one another : a quick pulse occasions a quick, breathing three or four of the former to one inspiration and expiration in man. In a horse, they are fewer on account of the slowness of his pulse in proportion. The lungs, like the heart, are constantly in motion dilating and contracting, by drawing in fresh air and throwing out contaminated air as described above. This action continues without interruption while life remains.

We have occasionally hinted in this chapter that, in certain chronic diseases, the blood is liable to morbid changes even while it circulates in the living body ; but these morbid changes will fall more properly

perly to be noticed when we come to treat of those chronic diseases in which the blood is supposed to be affected.

With regard to any information that may be drawn from the appearance of the blood in acute diseases when cold, it will be found, that no certain conclusion can be formed from it, since blood that is drawn from a horse, who is evidently disordered, will sometimes have the same appearance, when cold, as that drawn from a horse in health. On the other hand, blood, drawn from a horse in health, will sometimes have all the appearance of that drawn from one labouring under the most dangerous acute disease; and this may depend on so many concurring causes that renders it difficult to fix any precise standard how we may judge either of the healthy or morbid state of the blood in horses or other animals when cold; as its
appearances

as its appearances are even affected by the manner in which the operation of blood-letting is performed, and that of the blood's being received into the vessel whether by a full stream or otherwise.

Thus we have endeavoured to explain the nature and properties of the general mass of the blood, out of which all the particular fluids, or humours, in the animal body are drawn and made : we should now proceed, agreeably to our plan, to give the pathology of the blood arising from its morbid circulation, which, in some disorders, especially in fever, becomes so rapid as frequently terminates in the destruction of life.. But as we have not as yet treated on inflammation, irritability &c. it cannot be supposed that young pupils are sufficiently prepared for comprehending this subject till we advance farther in our ex-

planation of the above and some other phenomena immediately connected with it.

CHAP. VIII.

THE OFFICE OF THE ARTERIES, THE PULSE, &c.

IN a former Chapter, when treating on the heart and the circulation of the blood, we had occasion then to mention the structure of the arteries, so far as was necessary to explain the function of the heart; we are now more particularly to explain their office, pulsation, &c.

The

The arteries, in a living animal, are always full of blood. The jet or stream that starts from them, on being divided at or near the extremities, is not interrupted by alternate stops while the heart rests or relaxes itself between its dilatations and contractions, but it flows on in a continued thread. The microscope shows likewise that the arteries, in living animals, are full both in their systole and diastole, as the circular fibres of the arteries cannot contract themselves sufficiently to expel all the blood. When a new wave or column of blood is sent from the heart into the arteries, which, being already full, and although it bears but a small proportion to the whole mass contained in the arterial system throughout the body, yet, by its immediate contact with the preceding wave or column, which moves slower as it gets farther from the heart, it forces the same forwards, lengthens

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ens the artery, and makes it assume a cylindrical form, which increases its diameter by pressing the membranes closer to one another, and forces the convex parts in the bendings of the arteries outwards. This dilatation of the artery, by which its light or capacity is changed from a less to a greater circle, is called the pulse, the diastole of which is an expansion of the artery beyond its mean diameter. This action of the arteries arises from the heart only, and is not natural to them when left to themselves; for when the motion of the heart is suspended from any cause, there is no pulsation in the arteries; hence the artery is the more dilated in proportion as the preceding wave or column of blood moves slower than the succeeding wave which follows it.

The systole, or contraction of the artery, follows the dilatation of it; for the heart, having

having emptied itself, a short relaxation intervenes ; but the artery, by its innate elasticity and contractile power residing in its circular fibres, irritated by the stimulus of the blood, contracts itself, and expels as much blood as serves to dilate it beyond its mean diameter. As soon as the artery has freed itself from this wave or column of blood, and of course freed from distention, it collapses by its own contractile power, and is again ready to receive a new wave or column of blood sent into it by the heart ; hence follows repeated pulsation in the artery.

The swiftness of the blood's motion in the arteries is so great that it is carried through a space of about one foot in the space of a second of time ; and the constant plenitude of the arteries renders it impossible

to

to perceive any succession in the pulses of different arteries, from which it appears that all the arteries beat at one and the same instant of time. As soon as the aorta is filled with blood expelled from the heart, it is constricted, and thence, gradually, the same contracting power of the arteries proceeds to the extremities, where this pulsation ends, as the blood is then taken up by the veins and returned to the heart.

The arteries may be compared to the trunk of a tree, whose base begins at the heart, and gradually spreading its branches as it proceeds to the extremities, where they are lost by their minute branchings. Here the veins originate likewise in similar small branchings, and, taking up the blood, convey it to still larger and larger trunks, till at last, as it approaches the heart, it is collected in two large veins, and conveyed
into

into the auricle of the heart, and thence proceeds in a new circulation.

We have already mentioned the velocity with which the blood comes from the heart. But that velocity continually decreases from the resistance it meets with in the smaller arteries, as their membranous coats are thicker and stronger as the arteries grow less; besides the conical figure of the arteries themselves still growing narrower, and the wave of blood coming from the larger trunk, the blood is resisted in its passage through the minuter arteries, and therefore must be distended by force: the inflections and folds in the plates of the vessels likewise contribute to retard the motion of the blood, as some part of the impelling force must be spent or lost in removing these inflections in the vessels, and changing their figure into that of a round bore. The angles

gles in the vessels take more or less from the impelling force in proportion to their acuteness, or the more they recede from a straight line : allowance must likewise be made for the viscosity or tenacity of the blood itself, which, from indolence and too much rest, is disposed to harden into clots, and adhere to the sides of the arteries in the same manner as is observed in aneurisms and wounds of the arteries.

From these considerations, we may observe, that the blood, in the course of its circulation, meets with the greatest retardation in the least and smallest vessels. And this opposition must lessen the velocity of the blood in the larger trunks of the arteries, and to this may be added the opposition of torrents of blood to one another in the anastomosing of the smaller vessels.

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The blood in a living animal flows with the rapidity of a torrent in the larger trunks of the arteries ; hence a wound in a small artery near the heart is more dangerous than a larger one at a distance from it ; but in the smaller branches, it creeps along very slowly, and it is in these vessels it begins to put on a state of coagulation.

Since, therefore, as the force of the heart decreases as the blood goes on, and the contractile power of the arteries increases, the anterior wave or column of blood moves on slower, while the subsequent comes faster ; wave succeeding wave forms the pulse or that beating in the arteries between their dilatation and contraction, which may be best felt where the artery lies exposed bare to the touch, upon some resisting bone. But local inflammations frequently renders the pulse perceptible, where it never is so

naturally. In the human body, it is easily felt in the wrist. In our subject in the temporal and carotid arteries, and on the inside of the knee.

The pulse therefore is the measure of the powers which the heart exerts on the blood. In a healthy state, the pulse is slow and equal, because the heart, being free from any stimulus or unnatural resistance, is at full liberty to propel the blood with ease. A large full pulse shows that the blood flows through the artery without interruption. A small pulse shews the emptiness of the artery, on account of a smaller wave or column of blood being then sent from the heart. A hard pulse denotes some obstacle or resistance to the force of the heart, or it may be arising from a greater thickness of the blood, or from an increased rigidity of the coats of the artery. A quick pulse de-
notes

notes some stimulus or morbid sensibility, or irritability, of the heart.

The pulse is slower in large and bulky animals than in the smaller kinds of the same species. The heart in the former has a proportionably larger column of blood to propel to a greater distance, and at the same time to overcome the resistance or friction of the arteries.

The pulse in a healthy man beats about 65 in a minute ; towards evening it will beat about 80 ; in a horse about a middling size, about 45 in that time. Exercise through the day always increases the pulse towards the evening ; to the same cause likewise is owing the increase of feverish symptoms in patients towards the evening. Sleep not only retards the motion of the blood during its influence, but likewise the motion of all the humours in the body. A frequent pulse is commonly called a swift pulse ; it always
takes

takes place in young animals, but grows slower as they advance in age. A feverish pulse in man begins about 96 in a minute. It is counted moderate if it does not exceed 110 or 120, but it is considered excessive when it arises to 130 or 140 ; in which state the patient is considered as in imminent danger. The feverish pulse in horses begins about 80, or in proportion to the size of the animal.

Any resistance or hinderance to the circulation of the blood in the arteries, is found to quicken the pulse, as the heart in endeavouring to free itself, and remove the existing cause, contracts itself the more strongly and at shorter intervals. Thus, irritation from acrid blood causes a frequent pulse in fevers. Local inflammation, by resisting the circulation in the part affected, produces the same cause.

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The blood moves but slowly in the least or smallest arterial vessels, where the veins begin ; and as the weight of the blood in many places hinders its return to the heart, and as the coats of the veins have little or no contractile power to accelerate the motion of the blood, Nature has used various precautions to prevent its stagnating or concreting in the veins, by placing them near to the muscles, and likewise near to the arteries, that by their motion and pressure the blood in the veins is determined towards the heart. The veins are likewise supplied with more watery vapours, and flexile lymph, than the arteries, which probably parts with these vapours, by the great exhalation that is made from the blood in the lungs. From the above causes proceeds that quickness of the pulse, heat of the body, attended with a short laborious breathing, that follows on muscular motions by active exercises.

But

But, farther, those muscles which constantly press the contiguous viscera, by their motion on all sides, in the different cavities, powerfully promote the return of the venal blood to the heart ; besides the pulsation of the arteries, which run every where contiguous and parallel to the sides of the veins, have likewise their share in promoting this effect ; for, as we have already said, any impulse acting on the veins can determine the blood to the heart only.

Hence, the blood in a healthy animal, at full liberty to take sufficient exercise of body, moves on with such a velocity as enables it to deliver as much blood at every pulsation, by the vena cava to the heart, as it sends out by the aorta or great artery. But too much rest and inactivity of body, joined with weakness of the contracting fibres of the heart and arteries, renders this motion of the venal blood more difficult.

Hence,

Hence follow varicous swellings in the veins ; and by the slow return of the blood to the heart, those subtiler vapours formerly mentioned, are either absorbed or exhaled into the cellular substance, and produce those oedematous and pitting swellings in the bodies both of men and horses, particularly in the legs.

If we compare the blood of a living and a dead animal, that which is healthy with that which is diseased, and that which is inert, or too little moved, with that which circulates swiftly, we observe that, in the living animal, the blood is considerably warmer or hotter, of a more florid red, and appears uniformly alike in all its parts, and on being drawn into a vessel, it exhales that volatile vapour formerly mentioned.

In the dead animal, which has not yet begun to putrify or corrupt, we observe
that

that the blood has lost a great deal of its redness ; that it separates into a thinner substance ; that it exhales no vapour ; and that it is congealed in the veins. And even in the living animal, where the circulation is flow and languid, the blood is cold to a considerable degree.

If we compare the blood of an indolent, inactive animal who stands much at rest, perhaps stationary or confined to one place, with the blood of one that is accustomed to active exercises, we observe that the blood in the latter has a greater degree of heat, a more intense redness, more compact in its substance, and specifically heavier, at the same time its volatile parts are more abundant ; from all of which it is evident that these appearances are the effects of the motion of the heart and arteries, as they increase and diminish with that motion, and disappear when that ceases.

We

We have formerly observed, that the heart drives the blood into the arteries with great force, and with a confused or vertical motion, by which all the particles of the blood are agitated with a confused turbulent, and whirling motion ; being thus impelled against the curved sides of the arteries, it of course dilates or distends them into a greater convexity ; while, at the same time, the blood is propelled into the smaller arteries, capable of receiving one or more of the red globules, which, being forced into contact, rub and grate against the sides of the artery, insomuch that they are forced to change their figure in gaining a passage into the veins. This friction is supposed to generate, and keep up the fluidity of the blood, by perpetually rounding its globules, resisting their cohesion, and blending together particles of different kinds, which become more fluid by their mixing together.

The

The reticular distributions and inosculation of the arteries prevent any injury or danger that might occur from the loss of an artery, by being divided or compressed from any cause, as the next adjoining or anastomosing artery becomes distended and enlarged, on the admission of the blood that should have passed through the divided or compressed artery.

As the quicker motions of the blood, in the larger trunks of the arteries, conduce to sanguification, so the slower motions of it, in the smaller vessels, conduce towards the different secretions.

We have seen that the general current of the blood is carried through the larger trunks with great rapidity; but in the lesser ramifications of the arteries, the progressive motion of the blood is diminished, by which the more loose and colourless particles,

cles, separating from the dense and red globules, are expelled laterly, and to the circumference. Hence the attractive powers of the particles in the blood increase as their progressive motion abates. The oily or fat particles, coming into contact, go off by the open lateral ducts that lead to the cellular substance. The thinner juices are sent off through lateral branches of a much smaller orifice, till at length little more than the red globules of the blood remains to pass through the evanescent artery, into the incipient vein. But these particulars, by which secretion is performed, we shall consider hereafter.

From what has been said, it will be evident that muscular motion, or exercise,* is
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* The advantages arising from exercise, and the necessity of using it, especially to those horses who have no stated labour, and stand much at rest, we have

of the greatest importance in contributing its share towards promoting the circulation of the blood, &c. and of promoting the health of the body ; for, without a free circulation of the blood and juices, the general health of it is impaired, and diseases follow.

CHAP.

have already treated at large in a treatise on the Prevention of Diseases in Horses, and which has now gone through four editions.

C H A P. IX.

ON SECRETIONS.

HAVING thus considered the nature and properties of the blood, together with the office of the vessels which contain it, we come now to explain the way and manner in which fluids differing from blood are made out of it, and separated from it. This is called animal secretion. Nature always employs the most simple means to bring about her ends; she is never deficient nor sparing in the means to do every thing in the

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the best manner, equally avoiding redundancy and defect.

In the human body, and that of other animals of the more perfect kind, a great variety of different juices are required to answer a variety of purposes; all of which are furnished out of the same general mass of blood. The animal body, by certain powers it is endowed with, first makes red blood; and then out of red blood, by other powers, it draws off and forms all the other juices. Before we enter upon explaining the manner in which secretion is performed, we shall take a short view of the several kinds or classes of animal liquids, that are different from blood and made out of it, and then consider those which are of the most general importance to the animal economy.

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The juices or humours, which being deposited or strained from the blood into other vessels, may be divided into classes.

The *first* includes all the viscid and lymphatic juices, which are coagulable by fire and alcohol, like the white of an egg, and yet in the living body exhale in the form of vapour; but after death are condensed into a jelly. Of this sort is the gastric juice, and those subtile vapours which exhale into cavities, and prevent the parts from growing together, as into the cavity of the abdomen, &c. on being accumulated in too great a quantity, they sometimes produce dropsy, which assumes different names, according to the manner or place in which it is formed, as ascites, anasarca, hydrops pectoris, hydrops pericardii, &c. In the ventricles of the brain, they often create apoplexy.

The

The *second* class contains those juices, which being thinner and more watery than the former, are neither coagulable by fire nor alcohol, as those exhaled from the body in the form of perspiration, sweat, or tears ; the finer parts of the latter, after being poured out on the cornea and albuginea, are evaporated into air : the remainder is taken up by the lachrymal sack, and sent into the nose. Other liquids of this second class are not evaporated, but conveyed into their proper excretory ducts, as the saliva, pancreatic juice, urine.

The *third* class of liquids consists of such as are not coagulable by fire and alcohol, are not gelatinous, but watery, with some degree of viscid tenacity, on the watery parts being dissipated, turn into tough hard crusts : of this kind is the mucous or phlegm, which is found throughout all the respiratory passages, from the mouth and nostrils

to

to the extreme and remotest vesicles of the lungs ; over all the alimentary passages from the mouth to the anus, throughout the urinary passages. The cavities of the genital organs in both sexes, the semen, &c.

The *fourth* class of juices, or humours, comprehends those that are inflammable ; these, when newly secreted from the blood, are thin and watery, yet by stagnating where they are deposited, the watery parts being either evaporated or reabsorbed by the inhaling vessels in the containing receptacles, the oily inflammable part remains. Of this kind is the bile, the wax in the ears, the sebaceous secretions in the skin, eyelids, &c. the fat and the marrow, milk as it contains butter.

We have formerly seen, in treating on the properties of the blood that it contained, a

coagulating serum, an exhaling vapour, or water, a sort of viscid mucus and oil, from which we may perceive the possibility to separate from the blood all the foregoing classes of humours or juices, as their constituent principles are already in the mass of blood itself. But in what manner it is brought about, that oil or fat is separated from the blood in one part, a watery liquor in another, a gummy mucus in a third, is a question that still remains to be explained, and requires a previous description of the secretory organs themselves.

Those juices, which are coagulable, are separated almost every where from the arteries themselves into continuous excretory canals.

The albuminous liquor of the joints is secreted by certain glands called conglomerate, of a peculiar structure, which are situated

ated in the articulations of the bones, so that they may be moderately compressed, but cannot be crushed. This liquid being composed of fat medullary oil, and the exhaling liquor, constitutes an exceeding soft ointment, very fit for lubricating the cartilages, and lessening the friction on the parts. The structure of conglomerate glands is peculiar to themselves, and of a cluster like fabric, like that of grapes. In the joints, the larger clusters adhere for the most part to the bone, by a broad basis wrapped up in fat; from thence spreading out into a kind of crested edge, they pour out their liquor from an exceeding thin border by open ducts. Others of a lesser size are placed every where in the capsules of the tendons, and between the diverging fibres of the ligamentary capsules of the joints, which seem to be much of the nature of simple

ple glands, and are tinged with a yellowish mucus serum.

Those juices which are not coagulable of the first sort, are secreted in the same manner with those that harden, that is, from the exhaling arteries, which arise from the red sanguinous arteries, without any intermediate follicle or cavity betwixt them.

The salival glands are of the conglomerate kind, these glands being loosely conjoined together, into larger masses, by the yielding cellular substance, which forms a denser coat or covering to the whole, as we see in the parotid and maxillary glands. In the intervals betwixt these glandular clusters, run the arteries and veins, which are here considerably larger. Each of these glands or kernels send out an excretory duct, which, joining with others of the same kind, form

form larger trunks, which at last end in one canal, and conveys the humour to the part for which it is designed, as the cavity of the mouth, intestines, surface of the eyes, &c.

The *acini*, or kernels of these glands, appear to be composed of arteries and veins, divided and subdivided, parted and connected by the intervention of cellular substance, whose strata, growing gradually more compact as they enlarge, appear moulded into a globular or nut-like figure, as above mentioned.

Thin watery juices, neither coagulable nor wholly evaporating, are likewise, in other parts, generated without the assistance of conglomerate or kernel-like glandules.

Thus the urine is deposited from the red or sanguinous arteries, into membranous pipes

in the kidneys; these pipes are found to admit air, water, and even mercury to pass. In the same manner, the nervous juice in the brain seems to be separated in this way, although it is less evident.

The *third* class, or mucus juices, are almost every where separated into, and discharged from sinuses or hollow glands, of such a fabric as makes up a cavity every where surrounded by a membrane; these glands are very irritable; and when stimulated by any acrid substances, the quantity of their secretions are increased.

The extremities of the smaller arteries open into the above follicles or cells, from which are distilled or exhaled their respective juices, where being retained, the more watery parts are carried off by the absorbing veins, which correspond to, and resem-

ble

ble the exhaling arteries, by which means these juices acquire a considerable degree of thickness.

The mucous glands have excretory ducts, the orifice of which opens into a larger cavity, where mucus is poured out without any other intermediate duct, as in the back part of the tongue, the simple glands of the stomach and intestines, where they are denominated cryptae or cells. Sinuses are of the same structure as in the urethra of the male.

Another species of glands, termed *conglutinated*, which are simple follicles, folded up together in one common covering, the orifices of which open into one sinus, without forming any excretory duct, while others have excretory ducts of cylindric form opening into the cavity where the mucus is to be deposited. These ducts are sometimes

sometimes of considerable length in the subcutaneous and sebaceous glands, and in those of the palate and windpipe. In some parts, the orifice of those ducts are more discernable than the body of the gland itself, as in the nostrils, larynx, rectum, &c.

Many of these ducts, arising from their respective follicles, join together and form one common excretory canal; of this kind are the compound mucous glands of the intestines, jaws, stomach, &c.

Those juices that are inflammable are separated by organs that are of a different fabric. Thus, the fat and the marrow in the bones are deposited without the intervention of glands; the mouths of the small arteries open into the cellular substance where the fat is deposited, without the assistance of glandular follicles. The oily or sebaceous linament of the skin, &c. are
separated

separated by glands of different kinds, many of which lead directly to its follicle by a short passage, whilst others of the sebaceous glands have ducts of a considerable length. These sebaceous glands are very visible in some parts of the human body, as in the nose, &c. from the black concreted maggot-like substance that is forced out by pressure.

The milk, being formed of oil and watery juices, is separated by those glands that are termed conglomerate, formerly described.

The bile is separated in the liver, which being of a vascular fabric, it is distilled as it were from the biliary ducts, without passing through any cells or follicles into the common receptacle. But as our subject has no gall-bladder, it passes into the intes-

tines without any interruption or hindrance.

To a reflecting mind, it is matter of astonishment how, from one common mass of blood, the same variety of peculiar juices are constantly separated, each in its respective place; for we never see milk secreted in the kidneys, nor bile in the thymus gland, nor mucous in the sebaceous glands; this depends on the fabric that obtains in each secretory organ, adapted by nature to perform such and such effects.

It would appear that the blood, from whence any juices or liquids are to be secreted in the various organs of the body, assumes a certain character or disposition, in these parts, peculiar to itself; and that by constantly assimilating particles from the blood of a like nature with the humour or
juice

juice which nature intends to be separated from it at that particular place. For instance, the venous blood is carried to the liver with a very slow motion, full of oil or fat in a liquid state, and at the same time full of semi-putrid vapours from the intestines. In like manner, the blood is conveyed very slowly to the testicles, through very long, slender, and inflated canals, beginning at very small angles, and passing out of the abdomen under the skin, exposed to the external cold, which affords time for the different particles of the blood to be assimilated and collected together. It is probable that the more spirituous and dense parts of the blood ascend by the carotids to the brain, while the more watery parts of it descend into the abdomen and kidneys, as also to the forming the salival juices of the pancreas, the juices of the stomach and intestines.

The

The blood is farther prepared for secretion from its being retarded in the small vessels, the red and denser parts being carried along the axis of the vessel, while the lighter and more sluggish particles, moving with less velocity, are pressed laterly into the secretory orifices, which pass out from the sides of the vessels, where they adhere by their viscosity.

These orifices, though of different diameters, are yet very small; and in their natural and healthy state do not admit of the red globules of blood, yet they may, in certain cases of disease, be so far enlarged by an increased force of the heart, as to admit the red globules occasionally; for it has been observed, that when thin watery liquors have been injected into the arteries that they easily find admission into these secretory orifices or ducts, but do not admit of the thicker kinds of injections, as of wax, suet, &c.

&c. This kind of secretion is of the simplest kind, as the orifice or excretory duct can only admit of particles less than their diameters. Hence it is, that a pure liquor is secreted from the blood, and that the urineferous ducts exclude both red blood and coagulable serum in the kidneys.

It would appear that the secretions are generally made immediately from sanguineous arteries, without passing through the serous lateral ones; these separate the gross juices, thick, coagulable or watery, as the fat, urine, the juices of the stomach and intestines, &c. The secretions of the other thinner juices are made from the smaller pellucid arteries, whose orifices do not admit red blood, serum, fat, or other gross juices.

These

These small secreting arteries compose a kind of net work, and in general resemble the branching of little trees or shrubs. The trunks and arms of them sending out branches in every direction, and in different angles ; they are visible on the intestines, and resemble pencil brushes, and they are very thick and numerous on the spleen. In the kidneys, they have some resemblance to twisted serpents ; in the liver, they are like stars ; and in the testicles, they are like a lock of hair curled up like a button. It does not appear that there is any affinity between the fabric of the vessel and the nature of the liquor it secretes.

The inflexions or bendings of the smaller vessels, or excretory ducts, retard the motion of the blood, by which the viscosity of the juice to be secreted is increased, by giving its particles more time to cohere, or attract each

each other ; on the other hand, a straight course of these vessels adds to the celerity of their fluids, where a frequent copious secretion is required, as in the urine.

These conclusions may be drawn from the structure and appearances of the parts, from injecting the arteries to shew that nature by various methods can modify the secreted humours, by joining together, or separating and imparting to the various secretory organs certain powers of retarding or accelerating their juices, in order to produce thicker or thinner fluids, to answer the different purposes required ; as is observed in those that secrete the bile and semen, which are thick juices, and in the urine and tears which are more watery.

But though the process which nature observes in performing animal secretion within
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the glands cannot be explained; it may be asserted with great probability, that there is in the animal body certain assimilating powers, which in the secretory organs gives the particles procured from the blood their own proper quality, although these particles were before of a different nature.

We have already shewn that the blood contains particles of various kinds; those which are largest and most dense, as the cruor, will in the course of the circulation proceed onwards in the axis of the vessel, so as to pass on in a continued course from the artery into the beginning vein, while those particles that are more sluggish, as the fat, &c. will go off laterly by the orifice from the sanguineous artery, as in the secretions of the fat.

All the juices that are secreted, even the thickest kind, contain a great portion of water, which is afterwards separated from them

in

in glands with larger and smaller follicles or reservoirs, formed by nature for retaining the seminal juices, and to render them more thick and viscid. Thus the mucus, on its first being deposited, is thin and watery, differing but little from the perspirable matter, in which state it distils into the cavity of the nostrils, wind pipe, and intestines ; but, on long retention, the watery parts are absorbed, and it becomes viscid and thick, as is observed in coughing, blowing the nose, &c. in the human subject, and in the horse when he snorts, and throws out from his nostrils very thick mucus ; we have likewise examples of this in many instances, the bile at its first separation in the liver, is watery ; the semen becomes thickened, by being retained in the seminal vesicle ; but after repeated acts of venery, it is expelled very fluid ; hence it would appear that there are no real glandules, excepting those that are

formed for secreting a viscid liquor ; and if a viscid liquor is separated from an artery, without a follicle, it always stagnates in a larger one afterwards.

It would appear that one great end or use of the follicles and receptacles of glands, is to preserve the juice or liquor of whatever kind that is secreted for those times or occasions in which it is most necessary to be employed in the animal oeconomy. Thus the bile is reserved for the time of digestion. The semen for due venery, and the mucus in the nose to temperate the irritation of the reflux air.

Whatever is absorbed of these secretions and conveyed into the blood, is of great use to the animal body, according to its nature. Thus the absorption of the semen gives a
surprising

surprising strength and vigour to male animals.

We have thus endeavoured to describe the means and instruments of secretion, by which the secreted juices are either retarded or forwarded, according to the purposes of nature in the animal oeconomy. There are likewise provision made by nature to expel certain secreted juices, at convenient and proper times, when they are required. Some glands have particular muscles adapted for this purpose, as in the testicles of brutes; the urinary bladder; the gall bladder in the human body. In other parts muscular fibres are placed around certain organs, in order to expell or squeeze out their contained fluid, as the muscular coat of the stomach and intestines.

In other parts contiguous and incumbent muscles are added to promote such discharges, as in the masseters of the lower jaw; another

other mode observed by nature is irritability, which, on being excited to action by any stimulus, opens the shut passages, as in the discharge of milk and tears, &c. Stimulating matters occasion the thinner juices to flow most copiously, as from the nose, stomach, intestines.

What we have observed above will present a compendious view of the general doctrine of secretion. It is to be observed, that the greatest secretions are performed without the intervention of any such contrivance or structure under the appellation of gland ; as the secretion of the fat, perspiration, lymph, and even nutrition, may be very justly reckoned a general secretion. All these are performed by the simple mechanism of lateral tubes, of determined diameters, arising from larger ones, without any peculiarity in their structure that can denominate

denominate them of glandular contrivance.

We come now to consider the pathology or diseases that are peculiar to glands and glandular parts. In the human body these are schirrus, which generally precedes a cancer. The latter of which seldom occurs in our patients ; but a schirrosity in the glands is not uncommon as an attendant on some diseases.

A schirrus is a hard tumour in a glandular part, occasioned by an obstruction in the secretory tubes. Often scabrous and unequal on its surface, more especially when it takes place in such glands as consist of pretty large *acini* or kernels, as in the salivary glands.

We have already shewn, that in glands secretion is performed by secretory tubes, that are of too small diameters to admit red globules

globules of the blood ; and that the compound glands are made up of a congeries of convoluted tubes, which renders them liable to obstructions, both on account of the smallness of these canals, and their complicated structure, being rolled up like clues of thread, which increases the difficulty of their transmitting liquids even in a healthy state, and much more so when they become turgid or swelled from any latent disease, or from contusion. For it is observed by anatomists, that they can push their coloured ceraceous injections into very minute vessels, in membranous parts all over the body, but meet with great difficulties in injecting whatever is of glandular structure.

The causes of schirrus are whatever may contribute to thicken the juices that are to pass through these glands, or whatever may obstruct

obstruct or render narrower the minute secretory tubes, so as to hinder the propulsion of the liquids through them. Hence a resistance being thus caused to the progress of the humours, tumours and hardness of the gland is produced.

Glands likewise become tumified and inflamed on catching cold; this is observed both in men and in horses. The glands about the throat, in some cases, are much affected; and in some diseases when the virulent matter is absorbed, and passing through them, they become inflamed and swelled, which sometimes terminates in suppuration. Thus in a gonorrhoea in the human body, the inguinal glands in the groin are affected; and in horses that are glandered the submaxillary glands become swelled and inflamed, from the absorption of the virulent matter; symptoms attending these disorders.

The

The submaxillary and parotid glands in horses are frequently liable to inflammation and swelling on catching cold, especially in young ones. This disorder is called the strangles, and perhaps few or none of them escape that disorder at an early period of life; the inflammation and swelling of these glands frequently terminate in supuration, and discharge pus or matter either externally or internally, by the mouth and nostrils, which terminates the disorder.

In all recent glandular swellings, resolution ought first to be attempted by external discutient applications, as emollient pultices, fomentations made with emollient or discutient herbs.

In cases of cancer, whatever tends to heat or irritate the constitution, or to thicken the humours, whether in diet or medicines,
externally

or internally ought to be carefully avoided. While the integuments remain whole, and no matter issues from the affected part, the cancer is termed occult, but where there is a breach or opening, and the tumor attended with a discharge of foetid sanies matter, it is then termed an open or exulcerated cancer.

No remedy has as yet been found out sufficiently warranted by experience to be depended upon as a radical cure for a confirmed cancer, even that of extirpation as a palliative cannot be depended on; and in our patients when glands appear indurated from the absorption of virulent matter, from their proximity to an ulcer, or from virulent matter passing through them, as these are only symptoms of the disease, the extirpating of them, as has been too frequently done through ignorance, more especially the submaxillary glands, in that disease called the glanders, can have no effect whatever in re-

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moving or curing the disease, and only creates additional pain to the already distressed patient.

Deep seated glands are liable to disease in various other parts, particularly in long continued chronic complaints, the true seat of which cannot be ascertained, while the animal is in life, and can only be observed on dissection. Some glands are more liable to be affected than others. The lymphatic glands in our patients are more frequently found indurated than the mesenteric glands. The office of the sebaceous glands of the skin, in some diseases, are either suspended or so far altered that the skin and hair appear dry and shrivelled, which is called hide bound. The sebaceous glands in the eyelids are sometimes so affected in inflammation of the eye, that the juices secreted from them becomes so viscid as to glue up or cement, as it were, the eyelids. The mucus glands situated in the pituitary membrane

membrane in the nose, become inflamed in recent catarrhs and colds ; hence the mucus secreted from them is considerably altered, from its natural healthy state, to that which is viscid, thick, and glutinous, so as to impede or blunt the sense of smelling.

CHAP.

CHAP. X.

OF THE ABSORBENT VESSELS.

HAVING treated on the blood vessels and the different secretions drawn from the blood, we come now to consider another system of vessels called absorbents, or the lymphatic system, a knowledge of which is of the greatest importance to the veterinary pupil.

This

This system consists of the lacteals, the lymphatic vessels, and the thoracic duct, The glands belonging to them are of the conglobate kind.

The lacteals are pipes or tubes which in some measure resemble the smallest veins, which contain the red blood, but the contents of the lacteals resemble milk. They take their rise from the villi or numerous orifices on the inner surface of the intestines; from thence they pass obliquely through the coats of the latter, and enter into that part of the mesentery to which they are attached. As they proceed they unite with other lacteals, and form larger branches on the mesentery, and, passing through the mesenteric glands, continue their course till they arrive at the thoracic duct. Their office is to absorb or suck up the chyle or white milky liquor contained in the intestines,

tines, which is separated from the food or aliment by digestion, and convey it to the thoracic duct; from thence it passes into the subclavian vein, where it is mixed with the blood.

The lymphatic absorbent vessels are very small transparent pipes or tubes resembling the lacteals, of which there are two sets, the one superficial on the surface of the body, the other deeper seated. The fluid they contain is generally pellucid like water, and as various in its kind as the different parts from which it is derived. They originate from every part, from the extremities, from internal cavities, and from every organ within the body; they likewise convey their contents into the thoracic duct in their course to which, many of the deeper seated lie close to the larger blood vessels.

The thoracic duct is a continuation of the trunks of the lacteal and lymphatic vessels, but of an indefinite size or shape
varying

varying in different subjects; sometimes no larger than the ducts themselves, in others considerably enlarged and divided into large irregular trunks. It lies in a longitudinal direction below the vertebræ of the spine, near the emulgent arteries, passes obliquely under the aorta; its anterior part, running forward towards the extremity of the duct, opens into the left subclavian vein, where its contents mix with the blood.

The thoracic duct, the lymphatics, and the lacteals, are furnished with strong coats, although they appear thinner and more pellucid than those of the blood vessels; for, on injecting them with mercury, they resist a column of that fluid the weight of which would burst the blood vessels.

The coats of these vessels are supplied with arteries and veins for their nourishment; hence they are susceptible of inflammation, as
they

they are frequently observed, in such cases, in the form of a knotted cord, extremely painful when touched, and extending from an ulcer to the nearest lymphatic gland, as we see in cases of the farcy: the pain attending these swellings of lymphatic vessels evidently show that their coats have a great degree of sensibility, and that they are supplied with nerves as well as arteries and veins.

The lymphatic vessels in most animals are full of valves, which are more numerous than in the red veins; they are generally of a similar shape, and run in pairs. In some parts of the body, these valves are placed so near one another as to be but a few inches distant; in other parts, a considerable space intervenes without one single valve. When these vessels are distended with lymph, they appear larger on that side of the valves next to the heart, which gives them the appearance of being made up of

a chain of vesicles ; wherever a lymphatic vessel enters the thoracic duct or into a red vein, there are valves which prevent the return of the lymph, and at the same time hinder the blood from entering into the lymphatic.

These lymphatic vessels in their course to the thoracic duct pass through those glands which are peculiar to them, and which are called conglobate or lymphatic glands. These glands are so placed, that the lymphatic enters on one side and passes out on the other. They are sometimes of a round shape, and sometimes oval, frequently flattened, and of various sizes. They vary in size and colour in different parts of the body and at different times of life. In young animals, they are generally of a reddish brown colour, and become paler with age. They are covered with a smooth dense coat, which gives the external surface a shining appearance. These glands

are furnished with arteries, veins, and nerves, which enter into their composition, but with respect to their internal structure little is known.

The lymphatic vessels, as we have said, are distinguished into two kinds, the superficial and the deep seated. The superficial runs between the skin and the muscles, and properly belongs to the surface of the body, and to the cellular membrane which lies immediately under it. Those that are deeper seated, lie amongst the muscles, and accompany the arteries, one on each side.

The thoracic duct which receives the contents of the vessels we have described, varies in its size, in different subjects, and is formed by the union of the larger trunks of lymphatic and lacteal vessels, and frequently forms sudden enlargements, or what is called saculi or bags.

We

We have already observed, that the lacteals contain the chyle, which is that white milky like juice extracted from the aliments in the intestines, and afterwards mixed with the blood. Its principal composition is water and oil; sweet to the taste, and of a white colour. It is of an acescent and coagulable nature, and so light that it swims on the blood. Being composed of vegetable farina, with oil and animal lymph, it retains the properties of the volatile, animal, and oily aliments; changes into milk with very little alteration, but afterwards becomes more glutinous. If the watery parts are exhaled from it, and exposed to heat, it coagulates into a kind of jelly.

The motion and absorption of the chyle have been attributed to the attraction of the capillary vessels; but it would appear, that they have the power of selecting the chyle
only

only, and of rejecting thicker fluids, they observe alternate pulses, as it were, with the peristaltic contraction of the intestines. The villosity on the intestines absorbing the chyle, while the peristaltic force empties it, and presses the chyle farther forward in its course towards the thoracic duct, its farther progress seems to depend on the strength of the coats of the lacteal vessel; it is farther assisted by the alternate compression of the diaphragm,

The chyle on being mixed with the blood does not immediately change its nature, but after it has circulated through the body, and mixed with a variety of animal juices, it is at length so changed that a part of it is deposited in the cellular substance, under the denomination of fat; other parts are converted into the red globules and serum of the blood. The thinner and more watery

watery parts pass off by urine and perspiration, while some of it is retained in the habit for farther purposes in the animal œconomy.

The chyle is conveyed into the system with considerable rapidity, as it has been observed by experiments to move in the lacteals at the rate of eighteen or twenty feet in a minute, hence the vigour that we perceive in ourselves, so very soon after a moderate meal, and the renovating effect of cordials upon the system in certain cases, likewise the effect of diuretic medicines taken into the stomach, and their quick operation by urine, &c.

We have already observed, that the absorbent or lymphatic system, in all perfect animals, originate from every organ, from every cavity within the body, from the extremities,

tremities, and from the surface ; hence every particular organ, and every part of the body, has its own lymphatics or absorbents, all of which terminate in the thoracic duct as a receptacle, and from thence is conveyed into the blood. The lacteals may, therefore, be considered as the absorbents of the chyle, from the intestines only, as their origin from the inner surface of the latter, where they begin by very small orifices, may be easily traced to the thoracic duct by giving an animal milk, and opening it a few hours after ; the same fluid that is found in the intestines will likewise be seen in the lacteals ; but, at the same time, the intestines have their lymphatics as well as other organs of the body. We shall not, therefore, enter into a particular detail of the lymphatics arising from the different parts, by describing their course, &c. as it might tend to embarrass the young beginner. Let it suffice,

suffice to observe, that their use and office is the same throughout every part of the body, from its internal cavities, and from its surface, &c. and that the fluids contained in all these lymphatics arising from different parts, though various in its kind, yet agree in their qualities, transparency, and consistence.

Thus, we have endeavoured to give a short description of the structure and functions of the absorbent system, a knowledge of which is of the greatest importance to the veterinary student, as it throws considerable light on the nature and cause of many diseases in horses, which were formerly attributed to what is called *Humoural Pathology*, where the blood was supposed to be vitiated almost in every disease, as being too gross, viscid, or too thin, or, as the phrase was, full of humours.

But,

But, from the lymphatic absorbing system, we are able to account for many appearances in diseases, and to effect changes in the constitution on more rational principles. To the above system has been ascribed the power of new modelling of parts, and the various changes attending it, whether in health or diseases. Thus some glands that are very large in young animals, as the thymus is in a great measure absorbed on the animal approaching to maturity, many parts that were at first vascular are removed by the absorbents. The solids and fluids are continually changing, and carried back into the blood by the same means. Coagulable lymph is absorbed, extravasated blood carried off, and, not unfrequently, collections of water are taken up by the absorbents, and thrown out of the body by urine, &c. The superficial absorbents act on the surface of the body, by absorbing substances that come in contact with it, whether salutary

salutary or noxious. Hence the variolous matter of the small pox, or cow pox, is introduced into the system, which is called inoculation. Poison of animals is likewise introduced in the same manner. Mercury as a medicine which, in many cases, could not be given by the stomach, when rubbed on the surface of the body is absorbed by the superficial absorbents, and produces salivation, &c. And it is probable that morbid contagions, or epidemical diseases, are taken into the constitution by the superficial lymphatics, or by those of the lungs in breathing. The itch and gonorrhea are likewise communicated by the lymphatics to sound bodies by contact with the diseased.

The whole surface of an animal body seems to be a series of pores by which exhalation and inhalation are continually carried on by perspiration or absorption. Some matters are thrown out of the body,

while others are received or taken in. Thus humidity is absorbed from the surrounding atmosphere by the superficial lymphatics; hence it is observed that horses and other domestic animals, when exposed to its influence, do not drink so much water as when they are kept warm and housed; and many animals who are constantly exposed to all kinds of weather, night dews, &c. drink little or no water. Sea-faring people, in certain situations, have likewise found, when deprived of fresh water, that, by wetting their cloths with sea water, their thirst has been greatly abated. From this circumstance, it would appear that the superficial absorbent vessels possess the power of rejecting the particles of salt contained in sea water, and of taking in the watery parts only.

The deeper seated absorbents seem to act both on the solids and fluids, and as these are continually changing the absorbents carrying back into the mass of blood what they have absorbed from the different

different parts, and which is again rede-
posited in some other part, by the arteries.

Thus it is observed that bony excreſcences
as exostoſes or ſplents are removed or diſ-
appear, more eſpecially when the ſurround-
ing veſſels have been ſtimulated to unuſual
action by external applications.

We have thus deſcribed the action of the
abſorbent ſyſtem in the healthy ſtate only ;
but it would appear, from a variety of cir-
cumſtances in diſeaſes, that they ſometimes
act with too great force and energy, and
ſometimes with little or none, being almoſt
inert and inactive ; in the latter caſe, they
require to be rouſed, as it were, to action
by ſtimulating applications, ſuch as fric-
tions, mercury, cantharides, and even the
actual cautery,

This abſorbing power of the lymphatics
does not always depend on the ſtrength of the
general ſyſtem, for it has been obſerved, that
they frequently act with greater force or en-
ergy

ergy when the system appears rather weak; at other times, they seem to act faintly when the system is in greater vigour; but, in general, they act in proportion to the strength or weakness of the constitution.

In spring and autumn, particularly in the latter, if very wet, which is the moulting season with horses, some very material change seems to take place in the constitution, more especially in those who have undergone great fatigue, and much exposed to the inclemency of the weather. A certain debility and weakness pervades the whole system, attended with local swellings, and sometimes large anasarcaous swellings on the belly and breast, watery sores in the legs and heels, which shews that the deposit of fluids in these cases is greater than the absorbent vessels can take up, or that the absorbent system is then weaker.

The

The superficial lymphatics in horses are particularly affected in that disease which is called the Farcy ; and probably they are the chief seat of that disease, as they appear in its first stage like a knotted cord under the skin. As the disease advances, the lymphatic valves become inflamed, forming numerous pustules, or what is called farcy-buds, which open and discharge a kind of sanious matter, peculiar to that disease. Now, as the glanders is frequently either an attendant on the farcy, or in some cases the forerunner of it, hence if a farcy-bud or buds break out in the superficial lymphatics, situated in the pituitary membrane within the nose, whether in its cavities, or sinuses, it forms an ulcer which produces a discharge from the nostrils, resembling that which comes from the farcy-buds on the surface of the body. Here then is an ulcer, or rather, as in some cases, numerous ulcers formed, of the most inveterate kind, and which has hitherto resisted all the efforts of art to cure it.

No

No doubt the concealed situation of these ulcers which are formed in the cavities of the nose are one great obstacle to the curing of this disorder, as they are frequently found on dissection to be in such situations as are out of the reach of all external applications, whether administered by the nostrils, or by any number of perforations that could be made over the different sinuses of the head by trepaning in different places. Therefore any attempts made with a view of curing the glanders, when it becomes confirmed, must be by internal remedies; and as the veterinary science is still in its infancy, we would recommend to those who have the ability and opportunity of making experiments, not only on glandered horses, but in every case of disease relating to that animal, that they would persevere in their studies, and commit their remarks and observations to writing, adhering strictly to matters of fact at all times, and in all cases.

C H A P. XI.

INFLAMMATION.

WE have hitherto mentioned the terms inflammation, and of inflammatory diseases, in a general way. We are now to endeavour more particularly to explain what is meant or implied by the term inflammation, when applied to disorders of the animal body, whether external or internal.

In our definitions of inflammation, we have said in general, that it is an accumulation of blood in any part of the body, whether external or internal, and that this accumulation of blood in the minute vessels is brought on by increased circulation of that fluid, arising from various causes.

Inflammation is a disorder to which every organized part of the body is liable; we shall therefore consider it in its simplest form, and its several consequences, as it is observed to occur externally; and as the phenomena attending it will be more easily understood from considering it in that state, we shall begin with local inflammation in a circumscribed tumor, or what is called phlegmonous inflammation attended with a boil on the surface of the body, originating without any apparent cause. In this disorder the part affected is attacked with uncommon

uncommon heat ; tension, a throbbing pain, and in the human white skin with redness. When the tumour is of a small extent, it has no great influence on the general system, but when it happens to be considerable, and the inflammation extensive, a degree of fever takes place, attended with a full, quick, and generally a hard pulse, universal heat, and great thirst ; this is termed symptomatic fever.

We have observed above, that every organized part of the body is liable to inflammation, therefore what takes place on the surface, as in the above case of phlegmon, will likewise take place on the internal organs ; and although at first the inflammation may be local or circumscribed, yet it may become more extensively diffused, of which we have daily experience. We know that any external violence done to the surface of the body, as wounds, bruises, and

stimulating or irritating substances rubbed on the skin, will produce inflammation on the part that is injured ; here we know both the cause and the effect. Let us now enquire how inflammation takes place where no apparent or visible cause can be ascribed.

Various opinions have been advanced with respect to the proximate cause of inflammation, many of which, being founded only on conjecture, have never been generally admitted, others, after having prevailed for a time, have likewise been rejected. But the present doctrine on this subject is supported by stronger arguments in its favour than any that has hitherto been advanced, and which is supposed to proceed from an increased action of the heart and arteries, combined with a spasmodic constriction of the extreme vessels.

This doctrine readily accounts for the action of the several existing causes of inflammation,

flammation, for the effects it produces, and for the operation of the medicines and other means that have been used in the method of cure. These proofs will establish the probability of its being the proximate cause of all inflammatory affections; the different phenomena which occur in inflammation, seems, in every case, evidently to shew an increased action in the vessels of the part affected; from this increased action in the arteries of a part, all the circumstances attending inflammation are easily explained, from which we are led to consider such a state of the vessels as one cause, or rather the proximate cause, of inflammation.

This doctrine is farther supported from considering the several existing causes of external inflammation, as they generally are of a stimulating or irritating nature, and when applied to any living or sensible parts, they always are attended with

a preternatural exertion of the vessels in such parts.

Thus, corrosive and other irritating substances, applied to the coats of the arteries, produce the same effects as in other muscular organs. Every organ in the body have their own peculiar stimuli, exciting them to action in their different parts. The food or aliments stimulate the stomach and intestines; the blood stimulates the internal surfaces of the heart and blood-vessels to perform their functions. Hence therefore we can account for the action of all direct stimulants in the production of inflammation.

But it frequently happens, that general or diffused inflammation takes place, when neither stimulants nor irritating substances have been applied in any shape. We therefore conclude that in such cases the increased action

action of the heart and of the arteries, seems to arise from spasm or constriction of the extreme vessels, either of a particular part, or of the general system, as in fever.

From the tonic or astringent power of cold, we can account for the frequent occurrence of inflammatory diseases in long continued dry-cold winds. As the throat and lungs are more subject to these disorders, attended with inflammation, from the parts being more immediately exposed to its action. This is farther corroborated by the means that have been found most successful in removing inflammatory disorders; and as they are always attended with a hardness of the pulse, which is most effectually removed by general bleeding, according to circumstances, combined, in cases of external inflammation, with emollient applications to the part affected.

In

In all considerable inflammations, though at first confined or limited to one part only, yet the affection may be communicated, and become more generally diffused, by affecting the muscular fibres of the whole arterial system, as in fever. In the case of phlegmon or boil, where the action of the arterties is limited, and confined to one part, by propelling the blood into the smaller sets of vessels, where the red globules and other grosser parts of the blood become accumulated, and which they cannot easily transmit; hence we readily account for the redness, tumour, tension, and throbbing pain, that occur in such cases.

We have already observed that diffused or general inflammation seems to proceed from an increased action of the heart and arteries, by which the blood is propelled with increased force through the vessels, accompanied with spasm and constriction of the small vessels,

vessels, and an increase of heat, &c. This general inflammation prevailing in the system, produces what is called inflammatory fever, which is more or less rapid in its progress according to circumstances in the habit of the patient, and terminates sooner in death, or, as sometimes happens, proves a salutary effort of nature to throw off something noxious from the constitution. Yet in most cases, from the treatment hitherto observed in common practice, this species of fever proves fatal, and few cases have occurred in horses where the constitution could have been said to be mended by it.

In local inflammation, the vessels of that part only are affected, but if seated in some principal organ of great extent and importance in the system, it may spread and extend to other organs; hence a degree of general or diffused inflammation may take place;

at.

at the same time it is necessary to observe that there is something peculiar in the inflammatory diseases of horses, and more particularly in the above species of fever, which distinguishes them from similar affections in the human body, and which, in some measure, is owing to the great strength of the muscular coats of the arteries in this animal. Hence all extensive inflammatory diseases in our patients are so rapid in their progress, and soon come to a termination in one shape or another.

The disease of inflammation acquires different appellations, or names, according to the different parts it affects. Thus in the cellular substance, it is termed *Phlegmon*; on the skin, and those cavities which are lined by it, *Erysipelas*; where mucus is secreted, *Inflammation of the mucous membrane*; and so on of other parts.

We

We have observed that the term phlegmon or boil is commonly applied to a circumscribed tumor, attended with great heat, tension, and throbbing pain in the parts: when these are slight, and the part affected of no great extent, they hardly affect the general system. But, when considerable and the inflammation extensive, fever and all its symptoms may take place: If by an effort of nature, or from the application of proper remedies, the feverish symptoms together with the tumor disappear, this may be considered as the most desirable mode of termination of this disorder, and is termed *Resolution*.

But if all the above symptoms should increase, and the tumor gradually acquiring a larger size, turning soft and prominent in the middle, or tending towards a depending part, appearing less painful when touched, the feverish symptoms abating, and a fluid

found fluctuating under the skin, it may then be concluded that matter or pus is formed. This is another mode or manner in which inflammation terminates, and is called *Suppuration*.

If the febrile symptoms continue, with pain and tension of the tumor rather on the increase, while, at the same time, there is little or no change on it in point of size, the pulse rather sinking, there is then great reason to suspect, that a gangrene, or mortification, will soon take place; the consequences of which, in this situation, will be uncertain, although, at the same time, we have no hesitation in pronouncing what the consequences would be, when a mortification takes place in any of the internal organs, the death of the patient must follow of course.

External mortification in the parts are not so readily distinguished in our patients,

on

on account of the hair and colour of the skin, nevertheless there are several symptoms denoting the approach of mortification which may be depended on. The tumor turns flaccid, loses its tenseness or hardness, a number of small vesicles, containing a thin acrid serum, are dispersed over its surface, the parts become insensible when pressed, the pulse sinks, but continues to be frequent, and, if the tumor has either broke of itself, or been opened, its internal surface, in place of being of a bright red, will become of a dark leaden colour, or quite black. If the tumor is of small extent, the mortified parts separate from the sound and fall off, or they come away with the dressings, and the patient may recover the use of the part. But if the swelling and tumor is extensive, although death should not follow, yet the great loss of substance that ensues, in such cases, can never be filled up, the parts will be much disfigured, and perhaps the animal lame for life.

In

In phlegmonous inflammation, we sometimes observe an uncommon moisture or discharge of lymph, or serum, on the surface of the parts, like to a profuse sweat. This is another mode in which inflammation terminates, and is called Effusion: Thus it frequently happens, that in inflammation of the lungs, when the cellular texture only is affected, that it terminates by effusion; but if a greater effusion of serum takes place than the absorbents can take up, it lays the foundation for an hydrothorax or dropfy in the breast. When the mucous membranes are inflamed, as in recent colds affecting the head, the effusion from the nostrils is at first thin and watery, but afterwards it becomes thicker, more purulent, and the disorder goes off.

Erysipelatous inflammation is not easily distinguished in horses on account of the hair and colour of the skin; but the extreme pain and sensibility of the affected part,

part, when handled, together with the suddenness of its attack, the great extent of the swelling, and its rapid spreading in almost every direction, evidently shows its inflammatory disposition, and points out the necessity of applying the speediest means for relieving the patient. As it commonly begins its attack on the upper parts of the extremities both before and behind, it soon affects the trunk of the body; and if it should take its course towards the head, it swells to an enormous size; and, affecting the throat, threatens immediate suffocation. All these appearances we have seen take place in the course of a few hours. Country people term it a *weed* or *wyde*, others suppose it to originate from the bite of poisonous animals; but cases of this kind have occurred so frequently, in all seasons and in all situations where horses are kept, and that where no poisonous animal could be suspected to be concerned. Horses most liable to this disorder are those of gross habits, who generally are great or what is called

called foul feeders. The above disorder may be easily distinguished from anasarcaous swellings, as the latter are much slower in their progress.

We have observed that inflammation, in any part of the body, may be communicated to another or more distant part. This frequently takes place naturally; but, at the same time, it may be brought about artificially. This may be said to be another mode of termination of inflammation, and is called *Metastasis*, which is the transferring or translating a disease from one part to another. Thus inflammation in one organ, although not immediately connected with another, as in the convolutions of the intestines, whose surface touches a variety of other organs, and by being in contact with them, from proximity of situation, they become susceptible of the inflammation to a greater degree than the part that was at first affected; and hence the original inflammation is removed or changes its situation to that of another organ.

By

By an artificial metastasis, we remove the original inflammation from its first situation to another more favourable for our purpose of curing it. Thus for instance, in an inflammation of the lungs, we can raise a very active inflammation externally on the sides of the chest, or breast, by the application of irritating substances, as blisters, rowels, or even the actual cautery, if necessary; by which means the original inflammation is transferred from one of the most essential organs to life to others of less importance.

Upon the same principles, and by the same means, we can transfer violent inflammations from the head, eyes, and throat, by raising active inflammation externally on the breast or brisket.

With respect to the cure of inflammatory diseases, especially those on the external surface of the body, where large or
weighty.

weighty dressings become necessary, we labour under many disadvantages in our patients, from their restlessness and untractableness, and from the difficulty of keeping such dressings on the parts for the length of time that may be required. It is easy to prescribe, in such cases, but the great difficulty is to get the prescription properly applied with perseverance for any length of time.

The different modes in which inflammation generally terminates has been already mentioned, viz. resolution, effusion, suppuration, gangrene or mortification and metastasis. The cure of external inflammation, when of no great extent, arising from injuries, as contusions or bruises when recent, may, at first, be attempted by what is called the repelling method, that is by resolution, which is the safest and speediest method of cure, and this is done by topical remedies.

But

But, in cases of wounds or punctures, before this should be attempted, every extraneous substance should be removed, or such exciting causes of the disorder as may present themselves, or appear to have had the least tendency in keeping up the inflammation, such as foreign bodies in either wounds or punctures. Thus from a prick of a nail in shoeing, if the nail should split, which often happens, or the smallest fragment of it remain in the wound, the irritation it occasions will keep up the inflammation; and which, continually increasing, will in the end, from its confined situation within the hoof, bring on such a train of complicated disorder as will either kill the patient, or, if he should survive, render him useless and lame for life.

When, therefore, the cure of slight external inflammation is attempted by resolution, those applications which are of a sedative or cooling nature are chiefly to be depended on, as vegetable acids, and the

different preparations of lead dissolved in vinegar, as sugar of lead, or that solution of lead commonly known by the name of Goulard's extract : this may be applied either in a liquid state, cold, or by wetting cloaths in it, laid on the parts or used as the base of a cataplasm or poultice made with some farinaceous substance where it can be applied, and frequently repeated. In many cases, where the skin is ruffled, emollients may be used with advantage, as expressed oils, which are of a mild bland nature, made into ointments or linaments of soft consistencies, by the addition of a small portion of pure wax. But as oily, or greasy substances of every kind, tends to blunt the action of the preparations of lead, such remedies ought never to be applied at one and the same time : Whilst the above remedies are used, bleeding, as near the affected part as possible, will be of great use, and indeed ought never to be omitted.

But,

But, on the other hand, if the symptoms formerly mentioned, which attend inflammatory swellings, continue upon the increase, and a tumour seems forming on the parts, we may conclude, with certainty, that suppuration will take place, and that the repelling method observed above by resolution must be laid aside: we are then to endeavour to assist nature as much as possible in bringing the tumour to maturity by the formation of pus or matter. In such cases, all evacuations, whether by medicine or blood-letting, ought to be avoided farther than what may be thought necessary in violent cases of moderating febrile symptoms that may occur; for if the system is too much reduced by evacuations, the suppuration will be the slower in its progress, and more uncertain in its issue, although, at the same time, much depends on the seat of the tumour; as some parts are more apt to terminate in a speedy suppuration than

than others, according to their nearness or remoteness from the heart, their being situated in more soft cellular parts, or in those which are tough and membranous. Hence inflammatory disorders in the legs are more slow in proceeding to suppuration than in the trunk of the body and head. Inflammatory swellings about the throat and jaws, as in the strangles in horses, very soon come to suppuration, as matter is soon found to fluctuate in the tumour; but in some cases owing to the great thickness of the skin, which frequently prevents its exit outwardly, it forces its way into the cavities of the head, and is discharged by the nostrils.

Suppuration, by which is to be understood that process in nature by which the contents of tumours or ulcers are converted into a whitish, thick, opaque, and somewhat foetid matter, which, in surgical and medical

medical language, is termed *pus*; and although this may be considered as a natural exertion of the system, yet, in many cases, it requires the assistance of art, and in favourable situations, even in our untractable patients, with due attention we can assist nature in forwarding this process, by suitable applications calculated to relax the tension of the fibres, and to keep up or preserve a due degree of heat in the inflamed parts.

The means commonly used are, warm fomentations, cataplasms or poultices; the latter ought to be frequently repeated in order to keep up that degree of heat which the nature of the case requires. When fomentations are used, the part affected should be well fomented with any warm emollient decoction, applied by means of flannel pressed out of the liquor, in as warm a state as the hands of the operator can bear it, and continued for a length of time together

together by continual supplies of warm liquor ; covering the parts well up afterwards.

When the tumor seems rather indolent, or slow in coming to suppuration, or the skin thought to be too thick on the parts, or when it appears probable that the suppuration would be forwarded by stimulating applications, to increase the inflammatory symptoms, blister ointment may be rubbed on the part, or, perhaps, the actual cautery, which is more powerful and speedier in its operation, may be applied with advantage.

When matter is fully formed in a tumour, it commonly points at some particular part, generally near its middle ; and if a fluctuation is observed underneath, on pressure with the finger, the tumour may be opened with a lancet, at the same time making a depending orifice. But we shall

be

be more particular on this head when we come to treat of deep seated abscesses.

Having now treated of the termination of inflammation by resolution, effusion, and suppuration, it remains to make a few farther remarks on gangrene and mortification.

We have already mentioned the several appearances of gangrene externally ; we shall only now remark, that a thorough mortification of the parts, or what may be called the last stage of gangrene, may with certainty be known from the diseased parts becoming black, soft, and flaccid, losing all pain and sensation, and, at the sametime, emitting a very disagreeable fœtid smell, and followed with an entire dissolution of the different parts of which the organ affected is composed. When a gangrene takes place internally, especially in the lungs, it is attended with something of the same

same foetid cadaverous smell issuing from the mouth and nose in breathing, tainting the whole air in the place where the patient stands.

Erysipatous inflammation is observed most frequently to terminate in gangrene; and in some instances, it is so very rapid in its progress that the disease is hardly thoroughly ascertained before symptoms of mortification appears to have taken place.

The cause of this sudden transition of inflammation and mortification and gangrene may be accounted for in the following manner. In every case of inflammation, there is an evident increased action in the vessels, which propels into the smaller capillary vessels a greater quantity of the more gross parts of the blood than they were naturally intended to transmit; hence extravasation

travasation of these fluids follow ; when these are not considerable, they are frequently re-absorbed into the course of the circulation ; hence the cure is obtained by resolution ; but when an extravasation of the blood into the cellular substance takes place to a still greater extent, suppuration most frequently follows. But if this should not take place, the preternatural heat kept up by the inflammation is supposed to excite something like to fermentation, which, not being able to affect a thorough suppuration, and the crassamentum of the blood being more liable or more disposed to run into a putrescent state, mortification, which is a high degree of it, is naturally produced, and all its consequences follow.

In extensive mortifications, wherever situated, the pulse sinks, the natural consequence of that debility which always takes place in a putrescent state of the fluids in any disease, therefore this symptom may be al-

ways considered as a characteristic symptom of putridity. In the above cases, the antiphlogistic* method formerly recommended in the beginning of internal inflammatory diseases, must be laid aside, and a quite contrary method observed, in order to prevent the system from sinking too much ; and this is to be attempted by a proper use of cordials, but these cordials must not be of a heating or irritating quality, or such as the common cordial drenches, erroneously so called, are composed of ; but to consist of those medicines that are of the tonic kind, as the Peruvian bark frequently given in substance, which has been often found to have a very powerful effect in putting a stop to disorders of this kind ; and in patients that are considered of value, volatile alkali, cardiac confection, wine, &c. together with nourishing food.

There is another mode in which inflammation terminates, and which may be said
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* See Definitions.

to be peculiar to the horse, instances of which we have frequently seen in our practice, where the red globules of the blood, which had been extravasated during the violence of the disorder, have been afterwards found lodged in the parts like to dry red powder. This takes place within the hoofs. In corns and in bruises, but more especially in that disorder which is called *Foot Founder**, and which we have always found in the first instance to be a violent inflammation seated within one or both hoofs, and which if not properly treated terminates in incurable lameness. In many cases, we have observed the muscular laminæ, which form the bond of union between it and the laminæ of the hoof, intirely separated especially at the toe or fore
part

* The nature of this disorder we have explained in our *Veterinary Prophylaxis*, fourth edition, page 143.

part of the coffin-bone, forming a hollow or cavity, into which, after removing a very thin portion of the sole, a probe as large as a goose quill could be introduced a good way up between the coffin-bone and the external hoof; and, in this cavity, the dry red powder above alluded to was always observed. The dry corn in the inside heel of the fore feet, which appears red, or what is called Foxy, from its colour, contains more or less of this red powder or extravasated dried blood.

It is now well known that corns of this description originate either from unequal pressure of the shoe, or from the crust of the hoof being pressed from without on the internal sensible parts, occasioned by injudicious shoeing, by long caulkers, concave shoes, &c. by this means exciting a greater or lesser degree of inflammation in these parts, which produce the above symptoms.

In

In the case of bruises, the external sole, when scraped or pared, appears red on its outer surface, and still more so if pared farther into its substance, which evidently demonstrates the extravasation of the red particles of the blood in such cases, and the impossibility of their ever being re-absorbed again into the course of circulation.

From what has been said on the above subject, it will appear that, in all extensive inflammatory cases in our patients, whether external or internal, no time is to be lost in giving them the most speedy and effectual relief that our art furnishes us with ; for it is not sufficient that we, in many cases, preserve their lives, but we must likewise endeavour to preserve their future soundness. It ought likewise to be remembered that in all violent inflammatory cases in horses, although this inflammatory action
in

in the first instance may be considerable, yet it may and frequently does prove of short duration. The animal powers too often and too suddenly sink with very little or no previous warning, and debility ensues. Hence the necessity of watching these sudden changes, and of the veterinary surgeon visiting such patients more frequently than is commonly done.

On the first attack of inflammatory cases, the pulse is particularly to be attended to, as that is the only criterion to enable us to judge of the state of the circulating system, which is always more or less affected in such disorders; and this ought to be our guide in directing us how we are to proceed in our future treatment of these complaints.

Horses that are kept for active exercises are so thoroughly domesticated that their
mode

mode of life is entirely regulated by art ; they are kept up to their full powers by high nourishing diet, &c. infomuch that they may be said to live up to the utmost pitch their powers are capable off ; the higher their condition of body and consequent fullness of the system, the greater the risk they run when they are attacked with any internal disease, more especially those of the inflammatory kind, which, if not properly managed, as formerly observed, on the first attack, soon change to the putrescent state ; hence the vital powers suddenly sink into a state of debility, which terminates in death. But it is not our intention at present to enter minutely into a detail of the various diseases to which horses are liable, as that ought to form a regular separate work of itself, our plan being limited to the first lines only of the veterinary art.

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